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TELEGRAPHS.

REPORT BY MR. SCUDAMORE

ON THE

RE-ORGANIZATION

OF THE

TELEGRAPH SYSTEM OF THE UNITED
KINGDOM.

Presented to the House of Commons by Command of Her Majesty.



LONDON:

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1871.

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General Post Office,

25th January 1871.

MY LORDS,

I HAVE been anxious for some time to bring under your Lordships' notice the various steps taken by the Department under my control in the acquisition and consolidation of the property of the Telegraph Companies, and in its re-arrangement and development.

I have also been anxious to point out the difficulties with which the Department has had to contend in the accomplishment of its task, and to show how it has happened that the success which it hoped to attain, and which is now all but complete, was not attained in the first instance, or with the rapidity which could have been desired.

And I have also wished to place before your Lordships a statement of the revenue accruing from and the expenditure incurred in the undertaking, and to propose for your consideration and sanction the future establishment of the Telegraph Department of the Post Office.

With this view, I some time back instructed Mr. Scudamore to prepare a Report upon the whole subject.

My sudden retirement from the Department has prevented Mr. Scudamore from completing his Report during my tenure of office there, but he has prepared a considerable portion which is complete in itself, and which shows with much detail what the Post Office was expected to do, what it has done, and in what manner the work has been done. He has, in short, completed those portions of the Report which are of public interest, and, under these circumstances, I think it right to forward these completed portions for your Lordships information, leaving it to my successor to deal with the portion still in course of preparation, and which will treat of the financial results of the undertaking, and of the establishment which it will be necessary to form.

I have the honour to be,

My Lords,

Your Lordships' obedient servant,

HARTINGTON.

The Lords Commissioners of the Treasury.

REPORT.

GENERAL POST OFFICE,
January 1871.

TO THE POSTMASTER GENERAL.

THE re-organisation of the telegraphic system of the United Kingdom has now advanced so far towards completion that I am able to make a full, though probably not a final report, upon the steps which have been taken in the acquisition, re-arrangement, and development of the property of the late telegraph companies, and in affording to the public those advantages which they were led to expect would accrue to them upon the transfer of the telegraphs to the Government.

As more than five years have passed since the agitation in favour of the transfer (which had been proposed by Mr. Allan in 1854, by Mr. Baines of this Department in 1856, and by Mr. Ricardo, formerly chairman of the Electric and International Telegraph Company, in 1861) was formally and vigorously begun by the Edinburgh Chamber of Commerce, and since I was directed to inquire into and report upon the subject, and as it is probable that all but the immediate promoters of the transfer have forgotten why and with what objects it was undertaken, I propose in the outset of this Report to show what those objects were, and what were the advantages which the public hoped to obtain, and this Department undertook to afford, if the transfer were sanctioned by Parliament.

I propose in the next place to describe the difficulties by which the Department has been beset in the accomplishment of its task, and, in justice to those who have worked with me, to show why it has been that the complete success which is now close at hand has not nor could have been more rapidly attained.

I propose next to show what the Department has done towards carrying out the various branches of its undertaking, and what remains for it to do; what advantages have already accrued to the public, and what further advantages will accrue when the plans of the Department are completely carried out; and I shall have to describe with great but really unavoidable minuteness the modes of proceeding adopted by the Department, and the means employed by it to effect its purpose.

Lastly, I shall endeavour to state the financial results of the scheme, so far as it is at present possible to ascertain or estimate them, and to show in detail what has been the cost of acquiring, re-arranging, re-constructing, and improving the property of the late telegraph companies, what further cost has been involved in the purchase of rights and interests of other than the late telegraph companies; what further cost has been and will yet be involved in extensions of the system as it was handed over by them, and what has been, and will hereafter be, the revenue accruing from, and the cost of working and maintaining the completed system.

I shall be able to show that the Department is on the very eve of fulfilling all its promises to Parliament and the public, and that if its progress up to the present time has not appeared to keep pace with the expectations of the public, it has been at least as rapid as the circumstances in which we have been placed would permit.

I shall be able, however, to show that even in the first year of our operations we shall very nearly obtain, even if we do not actually obtain, the estimated gross annual revenue; that this gross revenue must inevitably grow largely from year to year; that though in the first year of our operations our estimates for cost of construction, reconstruction, and maintenance will, for reasons to be described, be exceeded, the normal proportion of expenditure to revenue will not hereafter differ from that given in previous estimates; and that the financial results of the completed scheme will not be less favourable than those which I have all along predicted for it.

The advocates of the proposition for the transfer of the telegraphic system to the Government desired to attain, and the Department undertook to work out the following principal results:—

A. The reduction and simplification of the charges for the transmission of telegrams throughout the United Kingdom.

B. The extension of the wires from railway stations lying outside of town populations to post offices in the centre of such populations, the extension of the wires

already carried into large cities towards the suburbs of such cities, and the extension of the wires from towns into rural and other districts unprovided with telegraphic accommodation. From the combined effect of these extensions it was hoped that a saving of time and a saving in cost of portage would accrue to the senders and receivers of messages.

- C. Such a complete separation of the commercial telegraph system from the railway telegraph system as would entirely relieve the commercial wires of railway messages, and throw on the railway wires those commercial messages only which arise out of the circumstances of railway traffic.
- D. Free trade in the collection of news for the press, of which collection the telegraph companies had hitherto had a monopoly, with low rates for the transmission of such news, no matter by what or by how many agencies it might be collected.

A.—The reduction and simplification of the charges for the transmission of telegrams throughout the United Kingdom.

Those who contended that the charges for the transmission of telegrams by the companies were too high rested their case solely upon the tariff which the Electric and International Company, the British and Irish Magnetic Company, and the United Kingdom Company, under the provisions of the Telegraph Act of 1863, had agreed to adopt for messages passing over but not beyond their own lines. Under that tariff the charge in Great Britain was 1s. for a twenty-word message over distances not exceeding 100 miles; 1s. 6d. for a message over distances exceeding 100 but not exceeding 200 miles; and 2s. for a message over distances exceeding 200 miles. For messages passing between Great Britain and Ireland the charge ranged from 3s. to 6s.

For additions of 10 words or less than 10 words half rates were charged in addition to the first charge.

The case against this tariff was so strong that the promoters of the transfer never found it worth their while to point out that it was limited in its operation to certain lines and districts, and that beyond those lines and districts there were very many unfavourable exceptions to it. In order that the public may know the full extent to which they have been benefited by the transfer it is necessary that these unfavourable exceptions should now be noticed. In the appendix to this Report will be found a list (Paper A) of 25 branch telegraph lines, belonging either to railway companies or to other telegraph companies than those before named, and for the transmission of messages over which branch lines an extra charge over and above the tariff before described was levied.

On these branch lines there were about 475 stations, to all of which the extra charge applied.

The extra charge was always high, and sometimes extremely high, in proportion to the ordinary tariff.

For instance, the charge for the transmission of a message from London to Granton, which is about 4 miles from Edinburgh, was made up of 2s. the charge to Edinburgh, and 1s. the additional charge to Granton. The charge from London to Penarth Docks, about 3 miles from Cardiff, was made up of 1s. 6d. the charge to Cardiff, and 6d. the extra charge to Penarth. The charge from London to Abingdon was made up of 1s. the charge to Reading, and 6d. the extra charge to Abingdon. The charge from London to Bournemouth, which is about 7 miles from Poole, was made up of 1s. the charge to Poole, and 2s. the extra charge to Bournemouth. These illustrations might be multiplied indefinitely.

Irrespective of the stations on these branch lines, there were about 460 railway stations in connexion with the system of the Electric and International Telegraph Company on messages to or from which an extra charge of 6d. was levied as a fee to the station master for his attendance and trouble.

Thus a message from Plymouth to Castle Eden was charged with 2s. under the ordinary tariff, and 6d. additional as the station master's fee.

Again, although the ordinary tariff was levied by the companies on lines between towns in both of which all companies had stations, yet if a message were forwarded by one company from a town in which it had, but the other companies had not, a station, to a town in which the other companies had, but it had not a station, the charge on it was composed of the charge according to tariff from the forwarding station to the

handing over station, and a further charge according to tariff from the handing over station to the receiving station. Thus the charge for a message from Southampton to Accrington would have been 2s. for transmission from Southampton to Manchester by the Electric Company, and 1s. for transmission from Manchester to Accrington by the Magnetic Company.

Lastly, the charge for a message between the Isle of Man and the United Kingdom was 4s. 6d., whilst the charge for transmission between the Channel Islands and the United Kingdom was 6s. 8d. for a London and 7s. 8d. for a provincial message.

The amount of the charges was not the only disadvantage of the system of charge which prevailed prior to the transfer. An almost equal disadvantage arose out of the complexity of the charges. It was difficult for the clerks, and still more difficult for the public, to know what the charge on a given message would be.

A varying tariff, framed primarily upon distances and secondarily upon routes is a tariff difficult to understand, and there can be little doubt that the prevailing uncertainty as to the charge prevented many from sending messages who would otherwise have sent them freely.

The proposals (for the transfer) which were put forward by Mr. Baines in 1856, though not the first in order of date, were the first which contained any practical suggestions as to the mode in which the transfer might be effected, any distinct practical statement of the advantages which might be expected to accrue from it, or any reliable data in support of the arguments advanced. At that time Mr. Baines had not long ceased to be an officer of the Electric Telegraph Company, and had fully in his mind the disadvantages and difficulties which were inseparable from a tariff so variable as that which then prevailed. He proposed that the charge for transmission should be at the rate of 6d. for 20 words, irrespective of distance. A tariff irrespective of distance had at that time been established in Belgium and Switzerland, but in no other country. In 1861 the United Kingdom Telegraph Company was formed with the intent to establish a rate of 1s., irrespective of distance, but it was compelled by the rival companies to abandon that rate and adopt in concurrence with them the rate which prevailed up to the time of the transfer. In 1865 the Edinburgh Chamber of Commerce advocated the establishment of a sixpenny rate, irrespective of distance, and their example was followed by the other chambers of commerce throughout the kingdom.

I have frequently expressed the opinion, which I still hold, that a sixpenny rate for messages of 10 words is that which will at no very distant date be found the best for this country, but I did not think it prudent when I drew up my first reports on the subject to recommend the adoption of so low a rate. The lowest uniform rate on the Continent was at that time a rate of one franc, the rate prevailing in Belgium and Switzerland, and it seemed to me that until some experience had been gained of the capacity of the English telegraphs to bear the increase of work which a reduction of tariff would bring about, it would be well to proceed cautiously, and I therefore recommended the adoption of a shilling rate, a shilling being in this country much what a franc is in Belgium and France.

When the Telegraph Bill of 1868 was before the Parliamentary Committee a sixpenny rate was strongly advocated by Mr. Allan, and by Mr. Patterson who represented the Liverpool Chamber of Commerce; and Mr. Potter, one of the members of the Committee, proposed that it should be adopted. The proposal was, however, rejected.

As it has been stated more than once since the transfer that some, if not all, of our difficulties have arisen from our having started incautiously with too low a rate, I think it is only right to call attention to these circumstances; and to quote, in support of my statement, the following passages from my own evidence:

"2505. (*Mr. Norwood.*) We had evidence given the other day by a very intelligent gentleman, Mr. Allan, I think, and he told us that, in his opinion, the system of charging per message of 20 words, and throwing in the address, is not a good and sound one, and that he prefers charging 6d. for 15 words including the address; what is your deliberate judgment upon that?—I think it is quite probable that, in the course of years, his opinion will be found to be correct, but I would rather begin with the 1s. rate.

"2506. That is your deliberate opinion?—It is. I was very much struck by what he said, and on thinking it over since I am inclined to believe that there was very great force in the remarks which he made, but it would be more prudent to begin with a 1s. rate. It would be necessary to give the address, because that is practically given at present, and we could not withdraw it from the public."

"2507. He only proposed to give 15 words, including the address?—That was for 6d., and eventually we should do the like, I have no doubt; but if the rate were reduced I should not exclude the address."

"2508. You have a strong objection to starting with less than 1s.?—Yes; I should propose to start with 1s. I should like to be safe at present. I should be very much surprised if we did not come to a sixpenny rate in a few years."

" 2540. (*Mr. Potter.*) You stated that you were satisfied with a practical monopoly?—Yes.

" 2541. Would not that practical monopoly be much safer with a 6*d.* rate than a 1*s.* rate?—Of course the lower the Government charge is the less fear there is of competition.

" 2542. Does not the whole tenor of your evidence lead the Committee to the conclusion that coming down to 6*d.* at once would be a safer step than the 1*s.* one?—I am afraid that the Committee would think me too bold and sanguine a person if I answered that question in the affirmative; I would rather be cautious.

" 2543. But if it were left for you to determine, would you not at once come to a 6*d.* rate?—I must not say that.

" 2544. Your private opinion would be in favour of a 6*d.* rate?—I will go so far as to say this, that if in three or four years' time there has been a large increase of business, yet not so much increase as I have anticipated from the reduction of rate, I should then feel certain that our only fault was in not having made a sufficient reduction, and should be desirous to recommend that we should come down to 6*d.*

" 2545. Supposing there were a loss for the first year or two, and that the taxpayers had to pay that loss, do not you think that the general public would be better satisfied if that loss resulted from your coming down to 6*d.* at once?—Possibly they might, but after all that has taken place before the Committee I should not like to see a loss in either the first, or the second, or the third year at all. I want to see it self-supporting from the first.

" 2546. Would you yourself anticipate any loss in the second year from the sixpenny telegraph system?—I have made so many promises that I must not make any more.

" 2547. You have spoken rather in favour of Mr. Allan's suggestion of 15 words?—Yes, I think there is great sense in it.

" 2548. Would there be any great difference in the cost between 15 and 20 words in a telegram between London and Aberdeen?—It would be imperceptible.

" 2549. Would it not be better to tempt a customer with the extra five words than to restrict him to 15?—Possibly it might, but still I do not know about that. To the great mass of people 15 or even 10 words would be enough, for there are really a great number of messages which could be comprised in a few words; for example, 'I shall not be home to dinner;' 'I will bring down some fish;' 'You can come and meet me at four;' and so forth. There would be millions of messages of that kind, and I do not know why we should give more words than the people wanted."

When the Bill, after it had been amended by the Committee, came again before the House of Commons Mr. Potter once more urged the adoption of a sixpenny rate, upon which the late Chancellor of the Exchequer, Mr. Ward Hunt, said: "That both he and I believed in a sixpenny rate, and had no doubt that eventually the rate would be reduced to 6*d.*, but that it was thought prudent to try the effect of a 1*s.* rate in the first instance."

The unofficial advocates of the transfer in their proposals for an alteration of tariff dealt merely with the initial charge for a message of 20 words.

The Government proposal, as it was submitted to the Committee of 1868, was that the transmission rate for 20 words should be 1*s.*; and that half a rate should be charged for each additional 10 words, or part of 10 words. On the motion of Mr. Goschen, however, it was decided that a quarter rate should be charged for each additional five words or part of five words. This was an important improvement.

I must not quit this point of my subject without reverting to the proposals which were made both in 1868 and 1869 for a departure from the principle of uniformity of rate by the adoption of a sixpenny rate for towns.

I think I may state that these proposals were rejected mainly on account of representations made by me, the nature of which may be gathered from the following extracts from the evidence given by me before the Parliamentary Committee on the Money Bill of 1869:

" 345. (*Mr. Laird.*) You say you propose to reduce the rate of charge?—Yes, we propose to have a uniform charge of 1*s.* throughout the country.

" 346. Will it be the same in towns?—It will be the same in towns; but I fully expect that in the course of two or three years we shall have a uniform charge of 6*d.*; I have very little doubt that we could afford, if that were the only question, to commence with a 6*d.* rate at first; but that rate would bring an enormous increase in the number of messages, and until we know accurately what number of messages we can carry, and what business we can do with the staff, we think we ought not to bring that increase of work upon us; that really is the only reason for not charging a lower rate than a shilling.

" 347. At starting, you will charge an increased price for town messages as compared to what they at present pay, will you not?—It is an apparent increase but not a real increase; because the offices are so far from the senders and receivers of messages, that the charge for portage places the whole charge above 1*s.*; but in future our 1*s.* will cover the whole charge in consequence of our offices being near to the senders and receivers of messages; I can show you that the 6*d.* messages are not to be much thought of, when I tell you that now, out of six millions of messages carried annually, only 160,000 are carried in the whole kingdom at a 6*d.* rate. We will say we impose an additional charge upon these 160,000 messages of 6*d.* each; but there are still two-and-a-half millions of messages carried at rates of 1*s.* 6*d.* and upwards, and on all those messages there will be a reduction. Now

160,000 is to two-and-a-half millions, about as 1 to 15, therefore, for every message on which we impose an additional charge of 6*d.*, we are going to take off a charge of 7*s.* 6*d.*

" 348. (*Sir Smith Child.*) But that does not console the senders of the 6*d.* messages?—There comes in my other statement, that the sender, or rather the receiver, of the 6*d.* message has to pay so much for portorage, as brings the total charge to him above 1*s.*; and from the greater proximity of our offices to the public, the result will follow, that in the great majority of cases the 1*s.* will include the portorage.

" 349. Does not the 6*d.* charge generally include portorage at present?—Only within a short distance of a telegraph office.

" 350. Within a mile, I think?—Yes, I believe so, but the greater number of the receivers are beyond a mile.

" 351. (*Mr. Weguelin.*) Are these 160,000 6*d.* messages of which you have spoken, principally commercial messages, or social messages?—I can hardly tell you; I am not able to say.

" 352. You made an analysis, from which it appeared that the greater portion of the messages sent off are commercial messages?—Yes, but I have not made an analysis of the 6*d.* messages specially; I think the probability is, that they are chiefly social messages.

" 353. (*Chairman.*) Under the Act of last year, the rate is to be uniform, is it not?—Yes.

" 354. So that the Government will not have the same means of meeting competition which a powerful company would have?—Undoubtedly a competitor might come in in a large town with a 3*d.* or a 6*d.* rate, and we could not take the same means as a private company would have taken, namely, lowering the rate, because if the rate was lowered in one large town, we should have to lower it elsewhere.

" 355. If you lowered the rate in London under the Act of last year you would have to lower it also between London and Ireland?—Yes, because the Act prescribes a uniform rate.

" 356. (*Mr. Hunt.*) When the Bill was under discussion last year there was a great pressure put upon the then Government to reduce the rate in the bill to 6*d.*, was there not?—Yes, there were two questions raised; one was that we should have a uniform rate of 6*d.* for all messages, and I have already given the answer to that, "We shall be glad to have a uniform rate of 6*d.* when we know that we can do the work;" the other was that there should be a uniform rate of 1*s.* for general transmission, with a 6*d.* rate in towns. We contended that that would be giving an undue advantage to towns over the country, because if there were a 6*d.* local rate, every townsman would be able to send a message, say, from Manchester to John of Groat's house for 1*s.*, and a message from Manchester to Pendleton for 6*d.*; whereas a man in the country would only have the 1*s.* rate, and no local rate for himself; therefore we thought it only fair and logical to have a uniform rate throughout the country. I am told that the distance of free delivery in the case of the 6*d.* messages is only half a mile."

The following clause from the Telegraphs Act of 1868 shows the final decision of Parliament with respect to the charges for the transmission of telegraphic messages. These charges can be reduced without further legislative action, but the principle of uniformity cannot be abandoned without the sanction of Parliament:

" 15. The Postmaster General, with the consent of the Commissioners of Her Majesty's Treasury, may from time to time make regulations for determining the hours during which the offices appointed by him to be places for the receipt and despatch of messages shall be open for the transaction of telegraphic business, and for fixing the sums to be from time to time paid for the transmission of messages, and for services rendered in connexion therewith, and for the general conduct of telegraphic business; Provided always,

Postmaster General to make regulations for conduct of business, and to fix charges.

- (1.) That the charges for the transmission of messages throughout the United Kingdom shall uniformly and without regard to distance be at a rate not exceeding one shilling for the first twenty words of each message, or part of twenty words, and not exceeding threepence for each additional five words or part of five words:
- (2.) That the names and addresses of the senders and receivers of messages shall not be counted as part of the words for which payment shall be required:
- (3.) That the sums charged for the transmission of messages shall be held to cover the costs of delivery by special foot messenger, within the limit of one mile of the terminal telegraphic office, or within the limit of the town postal delivery of that office, when it is a head post office, and the town postal delivery extends for more than a mile from it:
- (4.) That when the addressee does not reside within the above-described limits, and the sender desires to have his message delivered by special foot messenger, the charge to him for portorage by such special messenger shall not exceed sixpence per double mile, or any part thereof, beyond such limits:
- (5.) That when the addressee does not reside within the above-described limits, and the sender does not desire to incur the cost of special delivery, his message shall be delivered free of extra charge by the ordinary postal delivery next following on the arrival of his message at the terminal telegraphic office."

B.—*The extension of the wires from railway stations lying outside of town populations to post offices in the centre of such populations; the extension of the wires already carried into large cities to the suburbs of those cities, and the extension of the wires from towns into rural and other districts unprovided with telegraph accommodation.*

Those who advocated the transfer of the telegraphs to Government in the belief that if it were effected the results described in the heading to this section would follow,

were of course actuated by a desire to bring the telegraph offices closer to the population, and to reduce, for the senders and receivers of messages, the labour and cost of the transmission of the messages over a certain portion of the then existing routes. Prior to the transfer of the telegraphs to the State, the principal telegraph system of the country, that of the Electric and International Telegraph Company, had grown up on and in connexion with the principal railways of the country. This had come to pass, partly because the telegraph was seen to be indispensable to the exigencies of railway traffic before it was thought likely to be of great service to the general public, partly because railways in some respects, though not in all, afforded the best routes for telegraph lines, and partly because, in the case of the particular company to which I have referred, there was such an amount of connexion between the board of that company and the boards of certain railway companies as enabled the telegraph company to obtain a monopoly of way leave over certain railway lines. The result was, that in a vast number of cases the telegraph lines followed the railway lines, and terminated at the railway stations, which in the great majority of cases were outside of the town populations.

Mr. Baines, writing in 1856, and with his recollections of the Electric Telegraph Company fresh upon him, put the case thus. He writes:—

“ I have shown that of the 730 post towns, 260 only are telegraph stations ; of the latter only 50 have offices within the limits of the respective towns ; the remainder being at the railway stations, which are rarely within a mile of, and not unfrequently two or three miles distant from, the towns from which their respective titles are taken. An important increase of business must therefore result from the telegraph being readily available, and thus obviating the necessity for the conveyance of messages by hand over the distance between the railway station and the town. It is clear that if the post offices of all towns were removed to railway stations, a very considerable contraction of postal business would ensue, (not to speak of the inconvenience resulting to the public) as no letters, save those of comparative importance, would in all probability (owing to the intervening distance) be posted. This principle is equally applicable to the electric telegraph.”

As a matter of course circumstances had in many respects changed between 1856 and the autumn of 1865, at which time the formal agitation for the transfer commenced, nor would Mr. Baines' remarks as to the *post towns* have held good then.

By that time the Electric Company had extended their lines from many more railway stations into post towns, into which the Magnetic and United Kingdom Companies, which worked chiefly on the common roads, had carried their lines also ; but a large number of places which really required telegraphic accommodation were still served from railway stations lying outside the town limits.

In the Appendix to my first Report on the subject (which was made in July 1866), I gave a list of 486 towns in England and Wales, having a population of 2,000 and upwards per town (the list did not include the largest towns), and showed that at only 144 of those 486 towns was the telegraph office within the town limits.

I may here observe, though the statement belongs more properly to a subsequent portion of this Report, that at the present moment only 35 out of these 486 towns are without a telegraphic office in the very centre of their population, and that this change is due to the action of the post office.

The distance of many of these towns from the nearest railway telegraph station was so great that they could hardly be said to have had any telegraphic accommodation at all ; and the following remarks which appeared in my report of July 1866, were fully warranted by the circumstances of the case :

“ In Appendix F. will be found an account of the telegraphic accommodation afforded to certain towns in England and Wales, having a population of 2,000 persons and upwards ; and from this account it will be found that many populous places are so far removed from the nearest telegraph office (which is as a rule at a railway station) as to derive practically very little advantage from it. In short, Appendix F. shows broadly that, so far as telegraphic accommodation is concerned, while 30 per cent. of the whole number of places named in it are well served, 40 per cent. are indifferently served, 12 per cent. badly served, and 18 per cent., having an aggregate population of more than half a million persons, not served at all. If to this obvious want of facilities for, and increased cost of depositing messages at telegraphic offices, we add the high charge for telegraphic transmission, we have a surplussage of obstacles to the growth of telegraphic correspondence. We have, in short, in the telegraphic system of the United Kingdom precisely what we had in the postal system of the United Kingdom, before the year 1840, when the receptacles for letters were few in number, when the charge for transmission from post office to post office was excessive, and when the limits of the free deliveries were so narrow that large numbers of letters were subjected to additional taxation before they reached the hands of the addressees.”

It would have been easy to make out a still stronger case with regard to Scotland and Ireland.

Nor, when the lines were extended from the railway stations into towns was

the accommodation, even in the greatest towns, satisfactory to the public. The first memorial from the Edinburgh Chamber of Commerce contains the following remarks: "There are at present about 300 places in which all the three companies have offices generally situated, as in the case of our own city, within a few yards of each other. Many of these offices could be dispensed with, and their cost applied to the establishment of others placed where the convenience of the public rather than the necessities of competition required them to be placed."

Obviously it was the view of the Edinburgh Chamber of Commerce that these duplicate and triplicate offices did not afford duplicate and triplicate accommodation, and, as a matter of course, they were right in supposing that the companies in thus settling themselves in such close contiguity to each other were desirous merely of competing for the most lucrative site.

I might cite instances of many towns in which duplicate and triplicate offices were located side by side, or *vis-à-vis*, in the centre of business.

Liverpool, Manchester, Glasgow, Edinburgh, Leeds, Sheffield, Birmingham, Newcastle, Hull, Bradford, Brighton, amongst others, occur to me as conspicuous examples. And while the centres of the great towns were thus thickly studded with duplicate and triplicate offices, the suburbs were for the most part unprovided, or at best very scantily, with offices, and the residents in such suburbs were consequently in a great many cases outside the telegraphic free delivery, and therefore liable to an extra charge for portage on their messages. In 1868 the Electric and International Company put forth a pamphlet in which they deprecated the proposed transfer. In replying to that pamphlet (*see Parliamentary Papers*) I thus stated the case of Liverpool, Manchester, Edinburgh, and Birmingham:—

LIVERPOOL.

The district of Liverpool may be regarded as a semicircle with a radius of five miles. The river forms the chord of the semicircle, and all the telegraphic offices are on or very near to the chord, the principal of them being clustered together in the centre of the chord. The district is thickly studded with money-order offices which have been placed so as to suit the requirements of the population. Twelve of these money-order offices are at a distance of from one to two miles from the nearest telegraphic station, and the population served by them must, to a great extent, be outside the telegraphic free delivery. Three are from two to three miles, and three are from four to five miles from the nearest telegraphic station. The population served by these offices must be altogether outside the telegraphic free delivery.

MANCHESTER.

The Manchester district may be regarded as a circle with a radius of five miles. The principal telegraph stations are in the centre of the circle, but there are two stations on the boundary, and two at about four miles from the centre. These four stations are at opposite quarters of the circle. This arrangement would appear to promise a better accommodation than that which is afforded to Liverpool, nevertheless 17 money-order offices are from one to two miles, eight from two to three miles, and three from three to four miles distant from the nearest telegraph station.

EDINBURGH.

In the Edinburgh district all the telegraphic stations, with the exception of one at Granton Harbour, one at Leith, and one at Portobello, are in a circle with a radius of from half to three-quarters of a mile. No comment, therefore, is necessary to show that the greater part of the population, and especially the population of the southern suburbs, must be out of the telegraphic free delivery, and at a considerable distance from the nearest telegraph station.

BIRMINGHAM.

Taking the Birmingham district to be a circle with a radius of five miles, the principal telegraph offices will be found clustered together in the centre, and within a radius of half a mile.

Of the money-order offices with which the district is studded, 11 are between one and two miles, two between two and three miles, three between three and four, and three above four miles distant from a telegraph station.

In London, the Electric, Magnetic, and United Kingdom Companies had established a considerable number of branch offices, but in London also they had adhered to their plan of competing for the traffic of busy localities. The London and Provincial Company, too, had established what was designed to be mainly a local system, for the transmission, primarily, of messages from one part of London to another.

In reality, however, the lines of this company were mere feeders to the lines of the other companies, and were used mainly for the transmission of provincial messages over certain districts of London. Purely local messages were comparatively few in number, the time required for their transmission being usually greater than that in which the

post or a special messenger could have delivered them. Statements to this effect constantly appeared in the public prints for some years prior to the transfer.

In my first report (July 1866) I stated that when the transfer took place I should propose—

- To open a central telegraphic office at each of the 10 District Post Offices in London ;
- To open subordinate telegraphic offices at the sorting offices and receiving offices in each district ;
- To connect the subordinate telegraphic offices of each district with the central telegraphic office of that district ;
- To establish direct communication between each central telegraphic office and each other central telegraphic office in London.

While small towns and the suburbs of large towns were thus insufficiently provided for, even less provision was made for the wants of rural districts. These were almost entirely dependent upon railway stations, at many of which the service was occasional only, and at but few of which was there a regular messenger. I think it well, even at the risk of stretching out this report to an inconvenient length, to reproduce here a portion of the evidence which I gave before the Committee of the House of Commons, and which was then admitted to contain a correct statement of the amount and quality of telegraphic accommodation which had been supplied by the telegraph companies in town and country.

“ 62. (*Mr. Sargood.*) Having given us the position of the telegraph offices in relation to railways and towns abroad, do you find a great contrast when you come to England in that respect?—In the United Kingdom the greater number of telegraph offices are and have long been at the railway stations ; and the charge for transmission of messages to the offices at such stations is very frequently increased by the charges for portage out of the free delivery ; they do not carry the message so far by wire as the continental administrations do ; they have to carry it further on human legs, and therefore the charge for portage is somewhat higher.

“ 63. Your idea, if these matters should fall into the hands of the Post Office, is to carry your wires so near to the people that those difficulties will be overcome?—We should endeavour to use legs as little as we possibly could.

“ 64. You say as little as possible, but you do not mean to dispense with legs?—I am afraid, in the present state of the world, we must use legs to some extent.

“ 65. The published rates for transmission, I think, in this country, are generally those for the conduct of the messages over the wires?—Yes, and within a limited free delivery.

“ 66. Do they afford a fair approximation to the cost of the telegraphic message, bearing in mind that very much has to be supplemented by legs at an extra cost?—No, they do not. I can give some illustrations of that. For instance, there is apparently a sixpenny rate for transmission in some large towns, but the dispatching and receiving offices are so few in number in those large towns, and consequently so far distant from the bulk of the population, that a sixpenny rate can hardly be said to have a practical existence, whilst the time occupied in transmission is so great that the Post Office sometimes, and a private messenger almost always, can do the work more quickly.

“ 67. That being a general observation, applicable to everybody and everything, perhaps you can give us some local illustrations ; have you made any experiments with messages?—Yes, after the debate in the House of Commons on the second reading, when the question as to a sixpenny rate in towns was raised, I sent some experimental messages ; in Birmingham, for instance, I sent 10 messages to different parts of the town and its immediate suburbs ; in five cases the charge, including portage, was 1s. 6d. ; in two, 1s. ; and in three cases, in which 6d. only was charged, the postmaster informs me that, to the best of his belief, the messages did not pass through the wires at all, but were sent at once by hand to their destination.

“ 68. (*Chairman.*) Those were messages which were sent from one part of Birmingham to another?—Yes, they were all sent from the Birmingham post office to other parts of Birmingham. In Liverpool I caused nine trial messages to be sent to places in the town and its vicinity. In four cases the total charge was 2s. per message, and the average time occupied in the transmission was one hour and a quarter, and the average cost of the nine telegrams was 1s. 4d. In Leeds I am told that the 6d. rate extends to two points only, Holbeck and Hunslet lying within a mile ; and in Edinburgh I believe it extends only to Leith.

“ 69. (*Mr. Sargood.*) Can you bring us a little nearer home, and give us a little London experience?—In London I sent messages from the City to Camberwell, Kensington, Norwood, Lee, and Hampstead. In no case was the total charge less than 1s. The telegram to Lee, near Blackheath, cost 2s. ; and the Post Office messenger, after depositing it at the telegraph office, went down to the place of destination by railway with a return ticket, which cost him 1s., and he arrived 20 minutes before the message did.

“ 70. How did Kensington fare?—The message to Kensington cost 1s., and occupied fully two hours in transmission.

“ 71. That is worse than the omnibus, I think?—Yes. The message to Hampstead cost 1s. 3d., and occupied nearly three hours in transmission.

“ 72. (*Mr. Hope Scott.*) I suppose you abused the companies pretty freely for that?—We do not abuse them at all ; I do not ascribe it to any fault of the companies.

“ 73. (*Mr. Sargood.*) It is rather a weakness than a vice?—But it is a weakness which does not lean to virtue's side.

"74. I suppose between large towns messages may be transmitted rapidly?—*There is no sort of ground for complaint with regard to the transmission of messages between large towns, none whatever; the work is rapidly done, there is a proper force of messengers, and messages are carried out promptly and properly.*

"75. You think that, notwithstanding the result of your experiments, the delay is not a necessary consequence of the existence of telegraph companies, and would not be a necessary consequence of the Post Office conducting the telegraphs?—Certainly not, it is really in consequence of the telegraph system having grown up mainly round the railway system. There are in the United Kingdom a great number of places which are distant four or five miles from the nearest telegraph station, which is mostly at the railway, and there are a great number of telegraph stations in the United Kingdom which are open for public business only at intervals throughout the day, and from which the messages received are sent out for delivery by chance messengers only. I may mention that only a fortnight ago I received a telegraphic message at my house which was brought by a fishmonger's boy who had been pressed into the service by the telegraph clerk. His fish would not keep, but my message would, and therefore he delivered the whole of his fish before he delivered the message. I do not say this in disparagement of the companies at all, not for one moment.

"76. You are merely speaking as the experience of public life?—*I beg to say, once for all, that I have never concurred with those who accused them of habitual inaccuracy in the transmission of messages. I think that they have done their work uncommonly well, and in the first instance at very great pecuniary risk, and in spite of very great difficulties indeed.*

"77. We may as well meet this at once; your object is not to throw blame on individuals?—No; it is on the system.

"78. But merely to state the difficulties which exist?—Yes; and which will be removed.

"79. Do you believe that a public department responsible to the country is less likely to fall into those errors than private speculators?—I believe that a public department will be forced not to fall into such errors, or if it does, will be forced out of them instantly.

"80. Then we will relieve their minds at any rate by that acquittal; do you consider yourself that the amalgamation of railway work and telegraphic business is advantageous to the efficacious going on of the telegraphic work?—I do not quite understand the question; do you mean that I think it a misfortune that telegraphs have grown up around railways?

"81. No, I did not quite mean that; I meant whether you considered that the occupation which people have at railways was detrimental or otherwise to the acceleration of telegraphic business?—Undoubtedly, where the working of a telegraph is left to a station master or to a clerk who has other avocations, he cannot give time immediately to the transmission of the message, and when a message can only be sent out when there is a railway porter disengaged for the purpose, a delay in the delivery must take place; there can be no question about it.

"82. Do you consider also that telegraphic means of communication is of importance to the whole community, and ought to be placed within their reach?—I do.

"83. As much as facility of communicating by letter?—Quite as much; I think the more you can increase the means and facilities of communication, the more you stimulate trade, economise capital, and facilitate every operation of commerce.

"84. Having that view, do you think it a matter of such importance, that it is one which ought to be taken up by the Government in the interests of the country?—I do.

"85. And that mere private speculators for the advantage of dividend are not so likely to consider the interests of the public as the Government office would?—I think that they are bound to consider the interests of their shareholders before they consider the interests of the public.

"86. The question of capital and dividend, would not arise if those matters were under the management of a public office?—No; the Post Office would be bound in the interest of the nation to make its system self-supporting undoubtedly, and in doing that could not avoid making a profit; but profit is not the first object in view.

"87. Do the various Chambers of Commerce agree with you in the supposition that the telegraphic communications would be increased, if they were under the management of Government?—Representatives from the Chambers of Commerce of Liverpool, Derby, Hull, and I think Manchester and Edinburgh, will come before you bye-and-bye, to depose to that effect.

"88. Will you just explain to us the peculiar facilities which the Post Office possesses from the amount of its stations, if I may so call them, for extending telegraphic communication?—I would say first, that the Post Office has a large number of money-order offices, which it has opened with direct regard to the requirements of the population. The money-order offices are always in the centre of the population which they serve; as a rule, we open a money-order office wherever we expect that 12 money orders a week will be issued from it; but we constantly accord to places which are separated by a hill or a river or a considerable length of road from their nearest money-order office the accommodation which such an office will give, even although we do not expect that more than one money-order per working day will be issued at the newly opened office.

"89. Referring to what my learned friend, Mr. Rodwell, said about those maps on the wall, do we understand that each of those dots indicates the position of a money-order office? At least that, and it does something more than that. At the close of last year we had in the United Kingdom 3,700 money-order offices; that was one money-order office to every 1,450 inhabited houses, and the position of nearly 3,000 of those offices is shown on those maps on the wall. Those dots represent towns and villages having one or more money-order offices in them, and all the dots without exception, whether they are marked in black or whether they are marked in plain red, represent towns having one or more money-order offices. In London, which is only represented by one dot, there are upwards of 400 money-order offices; in Liverpool there is but one dot, and there are 40 or 50, and in Manchester, I think, as many. On the map of England and Wales there are 2,056 dots, representing money-order towns and villages. The dots which are marked with a black vertical line indicate the towns near to which there is a telegraph station where the attendance is not continuous, or where the messages are sent out by chance messengers only. The red dots which are marked by a black cross indicate the towns near which there is

a telegraphic station open regularly for business, and with a proper force of messengers to carry out the messages. The dots which are left plain indicate the towns which have no telegraph station near to them. I said that on the map of England and Wales there are 2,056 dots; 567 of those have imperfect telegraphic accommodation, 648 have perfect telegraphic accommodation, and 850 have no telegraphic accommodation. In Scotland there are 385 dots, indicating towns and villages having money-order offices; 92 have an imperfect accommodation, 97 a perfect accommodation, and 196 none. In Ireland there are 509 towns and villages having money-order offices; 33 have an imperfect telegraphic accommodation, 109 a perfect accommodation, and 367 none.

"90. I believe there are many telegraphs which are not maintained for railway purposes, but which are used for public purposes also at stations?—Yes.

"91. Can you tell us anything about their experience?—One of the telegraph companies has a charge book, I believe it is called, and that embraces 622 towns and villages; at 223 of those places the station master or his subordinates work the telegraph, and the public are cautioned in the following terms with regard to those stations:—The station master is permitted by the Railway Company to send and receive messages to oblige residents, but as his duties are manifold, expedition in the transmission of messages to or from those stations cannot always be relied on.

"92. That is the Telegraph Company's own notice?—Yes, that is the company's own notice. The company also work to and from 350 auxiliary railway telegraph stations, charging, I believe, an additional fee, which is the remuneration of the station master, so that it may be said that attendance is continuous at only 41 per cent. of their stations.

"93. I see there is no outline of counties or towns on these maps; can you give us any idea of the relative proportion of telegraph stations that are within the town in the midst of the inhabitants, and those that are away from it at a distance?—We endeavoured at first to show that on the maps, but we found it impossible unless we had quite covered the room; but I believe that at 1,300 at least of the 2,000 towns and villages marked on the map of England and Wales, there is no telegraph station within the town limits. In Scotland and Ireland the proportion of stations out of the town limits is much higher.

"94. Have you any idea of the average distance from the town where the stations are outside of it?—From the nearest money-order office the average distance is three-quarters of a mile, I believe.

"95. That is to say your system will bring the place three-quarters of a mile nearer the people than at present?—Yes, on the average.

"96. In very many instances?—Yes.

"97. With regard to the radius within which there is a free delivery at the various stations, would that be very much increased if you adopted the rule of making every money-order office a telegraph office also?—Undoubtedly, as the senders and addressees of telegraph messages would then respectively be nearer than they now are to the despatching and receiving offices the difficulty of sending a message would be reduced, the rapidity of its transmission would be increased, and the charge for extra portage would be more often avoided."

C.—*Such a complete separation of the commercial telegraph system as would entirely relieve the commercial wires of railway messages, and throw on the railway wires those commercial messages only which arise out of the circumstances of the railway traffic.*

The foregoing extracts from my evidence will show some of the disadvantages which arose out of the growth of the telegraph wires along the railway wires of the country. But they do not give a complete view of all these disadvantages. The following extracts from the paper prepared by Mr. Baines in 1856 will show more fully the defects of the system:

"The present telegraphic system (the lines of which are, with scarcely an exception, in possession of the telegraph companies) may be divided into two heads; the public service, and that of the railways. The majority of telegraph lines have wires apportioned for either service, but it will be seen from the following statement, that by far the greater number of telegraph offices are served by wires which should be employed solely for railway business.

"No. of post towns in England, Wales, and Scotland, which are telegraph stations	-	-	260
"No. which communicate by wires expressly set apart for public business	-	(about)	80
"No. communicating by wires which are also provided for the business and regulation of the railways	-	-	180
			260

"Thus at 180 telegraph stations, or two thirds of the entire number, a choice of two evils must exist: either the messages of the public must have precedence, and thus delay railway business, or *vice versa*. In the former case it is apparent that the safety of a railway train, and the lives of its passengers, may be endangered by the non-signalling of its passage, not to speak of the delay of other railway business of great, although perhaps not of such vital importance; or in the latter, the important dispatches of the public are possibly rendered of no avail by delay, while, perhaps, comparatively trivial railway business occupies the wires. The medium course, viz., that of both descriptions of messages taking turn according to priority of time, will not act satisfactorily. There are public messages which will not admit of delay while railway stations report, for instance, their spare rolling stock, and on the other hand, the announcement of the passing of a special train cannot be postponed until private communications, perhaps of a domestic character, are transmitted. Seven or eight years' experience in the working of telegraphs, and careful examination of the present system, have confirmed me in these conclusions.

“ Public safety requires that the electric telegraph should be fully developed in its application to railways—an opinion which has, I believe, been already expressed by the Committee of the Privy Council for Trade; and public necessity requires also its free use for the purposes of daily life. To mercantile firms of every description the use of the telegraph is indispensable; and any measure by which its free employment could be rendered less costly and more reliable in all seasons of the year, would be attended with the most important advantages. These results can only be attained by the maintenance of a sufficient number of wires for railway service only, with distinct sets for the commercial work.”

As a matter of course the system did not remain the same in all its details up to the time of the transfer, but it continued to be the same in principle. A great number of towns and districts, of which many were important, continued to be served by wires which were used jointly for railway and commercial works. The following are but a few illustrations of this joint use of the wires up to the time of the transfer. The districts between London and Tunbridge, between Tunbridge and Ashford, between London and Tunbridge Wells and Hastings, between Brighton and Portsmouth, between London and Bristol (Bath, Chippenham, Swindon, and Reading excepted), between Exeter and Bideford and Barnstaple, between Ipswich and Norwich, great parts of East Anglia and North Norfolk, the towns in Lincolnshire with few exceptions, the district between Birmingham and Leeds (Burton, Derby, Stafford, and Chesterfield excepted), between Carlisle and Glasgow, between Dublin and Galway, between Dublin, Wicklow, and Enniscorthy, between Waterford and Limerick, and between Dublin and Enniskillen were all served by wires, of which there was a joint occupation. The list might be multiplied indefinitely; and it is certain that wherever this joint occupation of the wires prevailed the delay in the transmission of messages, even under the high tariff, was only to be measured by hours.

The railway companies were fully alive to the disadvantages of the system, and though they at first, while they jointly with the telegraph companies were opposing the transfer, urged that the connexion between them and the telegraph companies was indispensable to the public safety, they afterwards took care to provide for the complete severance of that connexion by procuring the insertion of the following clause in the Act of 1868:—

“(2.) On such acquisition as aforesaid all the posts, wires, instruments, and other telegraphic apparatus belonging to the railway company, and also all posts, wires, instruments, and other telegraphic apparatus belonging to the telegraph companies on the railway company's lines and canals which are necessary for establishing a complete system of telegraphy in connexion with the working of trains, and the traffic of the lines and canals, shall become the absolute property of the railway company, and shall be handed over to them by the Postmaster General free of charge, in efficient working order, so that the railway company may be in a position at once to take up and carry on their own telegraph work on their own system, and thereafter the said posts, wires, instruments, and other telegraphic apparatus, shall be maintained and worked by the railway company.”

This clause has been carried out to the letter wherever it is applicable. The effect, of the separation of the commercial from the railway work, upon the commercial work shall be noted hereafter, but I may state here that so far as the safety of railway passengers can be secured by the employment of a free and unencumbered telegraph, the risks of railway travelling over great lengths of important line must have been diminished by the operations of the Government measure.

D.—*Free trade in the collection of news for the Press (of which collection the Telegraph Companies had formerly a practical monopoly), with low rates for the transmission of such news, no matter by what or by how many agencies it might be collected.*

Prior to the acquisition of the telegraphs by the State, the telegraph companies, whilst competing with each other for ordinary messages, were in combination for collecting and transmitting news to newspapers and news rooms. The rates which they charged for the collection and transmission of news were moderate; but, as they had the entire command of telegraphic communication in the United Kingdom, the newspaper proprietors who required news by telegraph were compelled to resort to them for it, and to take what the companies were willing to supply.

To ascertain what were the views of newspaper proprietors with regard to this arrangement, it is necessary only to refer to the evidence given by the representatives

of the Provincial Press before the Parliamentary Committee on the Telegraphs Bill of 1868. The following passages are extracted from that evidence:—

J. E. Taylor,
Esq.
7 July 1868.

THE CHANCELLOR OF THE EXCHEQUER.

1234. Arising out of those meetings, have attempts been made to establish an organization for the collection of intelligence for the newspapers, independent of the Telegraph Companies?—Some two years ago an attempt was made, before this Bill was in contemplation; and since we have had to consider what its effect would be upon the Press, we have also been engaged in establishing such an organization.

1235. Have you seen your way, since this scheme was before Parliament, for organizing a system of obtaining news for the Press?—I see no difficulty whatever in it.

1236. The newspaper proprietors propose to collect their own news through an intelligence department, and that the Post Office should have nothing to do with it, except so far as regards the transmission of the news, when so collected?—Yes.

1237. As regards the interests of the newspaper press, do you think that system would work better than the Telegraph Companies having the intelligence in their own hands?—I think decidedly better.

1238. The newspapers will collect the news which they think will serve their purpose, and they will be independent of the views of any other bodies collecting intelligence for them?—Yes, just so; they would collect it by a co-operative association.

1239. Under the present system, you are in the hands of the Telegraphic Companies as to what news they will send you?—Entirely.

1240. Have you found it the case sometimes that you have received news you did not want, and were out of news that you did want?—Yes, that is so.

THE CHANCELLOR OF THE EXCHEQUER.

1243. Are the rates which you have agreed upon, and which are proposed to be inserted in the Bill, these: for night messages, 1s. for 100 words to one address?—Yes.

1244. And 2d. for the transmission of the same matter to every additional address?—Yes.

1245. And the day rates will be the same, except only that 75 words will be considered a message under the proposed tariff instead of 100 words?—Yes.

1246. Will you compare the cost to you of receiving news in that way with the present cost of receiving the news from the hands of the Telegraph Companies?—It is not very easy to compare it; the comparison, after all, can only be an approximate and theoretical one. I should like to explain, that at present a large proportion of the news published in the provincial newspapers is received under a subscription contract with the Telegraph Companies. The Telegraph Companies report the Parliamentary debates, and send reports of markets and other matters to the amount of about 4,000 words per diem on the average. They deliver that matter to us in the country, and charge us rates varying from 150l. a year to 250l., the average being about 200l. By the tariff proposed to us by the Post Office authorities, the cost of transmitting a similar amount would be somewhere about 126l. or 127l. a year, and we conceive that for the difference between that and 200l. probably the news might be collected by the organization we propose to establish.

1247. At present the 200l. covers the cost of the collection of the news?—It covers the cost of the collection of the news and the transmission.

1248. The 127l. which you reckon you would pay to the Post Office would only cover the cost of transmission?—Yes.

1249. You think that the difference would be absorbed in the expense of collection?—I should say fully absorbed in the expense of collection.

1250. Therefore you do not expect that to you the cost will be less?—I think, if anything, it will be rather more.

1251. If the cost will be more, wherein will be the advantage of the change to you?—I think that we shall be able to supply ourselves more precisely with that description of intelligence which we require.

1252. In fact the quality of the article will be better?—Yes.

THE CHANCELLOR OF THE EXCHEQUER.

1255. As I understand it, under the existing system, the supply of news is a thorough monopoly?—It is so.

1256. Have any disadvantages been found from that monopoly?—Yes, I should say decided disadvantages; we have not such facilities as we should like to have, and as would enable us to conduct our business in the most convenient manner to ourselves.

MR. LEEMAN.

1312. Has your attention been called to the arrangements to be made by the Post Office with regard to news-rooms and exchanges in the country?—Yes.

1313. Do you know what arrangement is to be made by the Post Office with regard to them?—I do not.

1314. Has it been a matter of discussion at your meetings?—Certainly.

1315. Has the Press objected to the Post Office supplying news rooms and exchanges?—Some persons have objected, at our meetings, certainly.

1316. Many?—A considerable number were prepared at first to object, but I should say J. E. Taylor, Esq.

1317. At first there was a very strong feeling on the part of the Press against the news-rooms and exchanges being supplied?—Yes, in certain quarters there was a very strong objection. 7 July 1868.

1318. How did that feeling change?—It has changed during the process of the discussion in the Bill, especially at the meetings we have held. I believe that the balance of the argument is strongly in favour of letting the Post Office do as they like upon the matter of either supplying the news rooms or not, as facilities may be given.

1319. I find in a letter of Mr. Fisher's this paragraph: "I believe the newspapers, if not thus interfered with, will pay a larger sum for the intelligence than they can do where its value is destroyed by posting it in public rooms before it can be printed;" has that been the argument?—That has been the argument, to a certain extent.

MR. NORWOOD.

1328. With regard to the cost you do not object to the present charge for news made by the telegraph companies, but you object to the quality of the news?—Yes.

1329. You frequently have intelligence transmitted to you of little or no value for your purpose, and transmitted in a form in which it is of little service to you?—Yes.

1330. You believe, having yourselves the power of collecting such intelligence, you would be able to serve the public better?—Yes.

1331. You are prepared to incur any little extra expense in the collection of news which may be necessary in the first instance?—Quite so.

1332. You have no fear at all that the Post Office will treat the entire newspaper press in the provinces with perfect equality and fairness?—I have not.

1333. You have confidence that they will act with strict impartiality, that your expression of opinion on public matters will not be guided or influenced by the fact that, to a certain extent, you are in the hands of the Post Office?—I believe we shall have a much more effective control over the telegraphs than now.

1334. You would not hesitate as a journalist to make comments upon public affairs with the same freedom as now, or with even still greater freedom?—Certainly not.

THE CHANCELLOR OF THE EXCHEQUER.

1364. You have heard Mr. Taylor's evidence as to the terms of the agreement with the Post Office for the transmission of news for the newspapers?—Yes.

1365. Do you agree with his views upon the matter?—I think that under these rates we shall be paying quite as much for the transmission of news as we are paying now; but I believe we shall get a better supply of news.

W. Saunders,
Esq.

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THE CHANCELLOR OF THE EXCHEQUER.

1370. Apart from the news which is supplied to you by the agency of the intelligence department of the Telegraph Companies, do you occasionally have special messages?—Yes, we get them, but rarely, for the rates for their transmission are too high.

MR. NORWOOD.

1380. I mean this; would not it be possible for the Post Office to say, "We will not supply such and such a paper?"—I imagine that the Bill itself will compel them to supply papers on equal terms. At present the telegraph companies are not compelled to supply all papers on equal terms; they may supply particular papers or not, as they please, and on what terms they please.

1381. Has an instance of this kind come under your notice, have you ever heard of a case in which a newspaper proprietor purchased a paper, and when he became possessed of that paper, and applied to the intelligence department of the Telegraph Companies for the usual supply of news, the reply made was, "Yes, but there happens to be an outstanding account with the former proprietor of your paper, and we must have that paid before we treat with you?"—That has happened twice to me personally.

1382. You were compelled to pay the debts of your predecessor as the price of obtaining information on the ordinary terms?—In the first case I discontinued the supply of news, and did not pay the claim. In the second case I was obliged to pay the claim.

1383. What did that amount to?—77l.

1384. You had to pay 77l. of your predecessor's debt as a condition of your receiving the ordinary intelligence supplied to the newspapers?—Yes.

THE CHANCELLOR OF THE EXCHEQUER.

1450. Do you live at Belfast?—Yes.

1451. Are you the proprietor of the "Northern Whig," published there?—I am.

1452. Have you been in the habit of receiving telegraphic news for the use of your paper?—Yes, I have, since the commencement of telegraphic communication with Ireland.

1453. Do you find the present system is all that you would wish?—No, I do not.

1454. In what respects have you reason to complain of it?—My objections to it are threefold. I think it is inefficient in certain respects; I think it is too costly in certain

F. D. Finlay,
Esq.

7 July 1868.

F. D. Finlay,
Esq.

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respects; and I think that it has placed in the hands of Telegraph Companies a power which they have used in a despotic and arbitrary manner.

1455. We will take those points in order. Why do you say that it is inefficient?—Because there are delays and errors, both of which are seriously inconvenient to us, in consequence of there being a submarine communication. The second point is with regard that it is too dear. It is not too dear if the absolute number of words transmitted by the company be calculated in proportion to the amount annually charged; but the gross sum is too dear, inasmuch as they send us a quantity of matter which we do not require, and refuse to supply us with the quantity of matter which we do require. I can give instances, if the Committee wish it. They supply us with a quantity of foreign intelligence, derived through the agency of Mr. Reuter, a considerable portion of which is so absolutely valueless to the Irish press that we do not even take the trouble to insert it, and for this supply of Reuter's foreign intelligence the Telegraphic Company insist, in spite of remonstrance, on very materially increasing our annual payment. With regard to home intelligence, the Telegraph Company will not give items of information which are of special importance. In illustration of that I may mention that when Lord Lurgan won the Liverpool Cup they absolutely refused to tell me who the winner of the Liverpool Cup was, and I had to pay 3s. for a message to Liverpool, to make my inquiry 3s., and 3s. for the reply, though I knew of my own knowledge that the information was in the telegraph office at the time.

1456. Your readers are very often more interested in English sporting news than in foreign political news?—There are 10,000 people in Belfast who would wish to know that Lord Lurgan had won the Liverpool cup for one who would wish to know what had passed in Bulgaria.

1457. You think that the Post Office would transmit news to you about the Liverpool cup, if your agents sent it to them, quite as readily as they would transmit news about anything happening in a remote foreign country?—The Post Office would make no distinction in the matter. We would supply the news, and the Post Office would transmit it without regard to its character. The third objection to the existing system is, that the action of the Telegraphic Company is despotic and arbitrary, inasmuch as, by the combination, the companies have acquired an absolute monopoly of the news supplied; whereas a broker who is not satisfied with the Magnetic Telegraph Company can send his messages to the country and to London by the Electric Telegraph Company. The newspaper proprietors can make no selection. I have my contract with the Magnetic Telegraph Company. I am not, and have not been satisfied with that company, but I cannot be supplied by any other Telegraph Company. In consequence of the combination, there is no competition in the transmission of news.

1458. Can you give any instance of the exercise of that despotic action on the part of the company?—I can. On the 8th of June I wrote an article in the "Northern Whig," in which I supported the Bill at present before the committee. I spoke of the advantages of it to the public and to the Press, and I made a very severe complaint of the manner in which the Press had been dealt with, winding up by saying that we (speaking in the name of the paper) did not attempt to conceal our personal desire that we should be relieved from the pressure that we had submitted to for so long. On the 13th of June Mr. Boys, the superintendent of the Intelligence Department, wrote to me a letter.

1459. Have you that letter?—I have a copy of it.

1460. Will you read it?—"Intelligence Department, Telegraph Station, Telegraph Street, London, E.C., 13th June 1868. Dear sir, I will submit to the next meeting of the directors the article in your journal of the 8th instant. I have never received from you any complaint of errors, &c., and if you had made them every case would have been carefully investigated. The printed attack is, therefore, most unjustifiable. Your assertion that the charges are exorbitant is at direct variance with the statement you made to me when last in London. The time appears to have arrived when the directors should seriously consider whether the contract with your journal should be continued, and I have no doubt they will come to a decision which may afford you an opportunity of making your own news arrangements on less exorbitant terms. I am, dear sir, faithfully yours, Charles V. Boys."

1461. Had you any means of making other arrangements than those through the company whose representative wrote that letter?—The only alternative open to one would have been to engage a special wire to Belfast, for which I should have had to pay 1,000% a year, and to organise a news collection of my own, which might have cost anything up to 5,000% a year; so that if the Telegraph Company had carried out this threat they might have ruined me, provided I could not afford to pay 6,000% additional for my expenses. That is the alternative that was presented to me.

1462. So that the company had the power, if they wished it, of saying you should not receive telegraphic news unless you took a certain line in your paper on particular questions?—Yes; to controlling my action in the management of my newspaper.

1463. Is that a condition of things which could be tolerated by the editor of a newspaper?—It is a condition of things which I should not tolerate at any rate, and I should think it would be intolerable to any man of independence.

SIR FREDERICK HEYGATE.

1478. Do those telegraphic arrangements ever fail, owing to accidental causes?—Occasionally, but not frequently.

1479. How many times in the course of a year are you prevented from obtaining your telegrams?—Half a dozen times in the course of a year; due to natural causes, electrical disturbances, and violent tempest.

1480. When that happens, your arrangements are very much impeded?—We have then no telegraphic information supplied to us. F. D. Finlay, Esq.

1481. Do those accidents arise from there being only one submarine wire at work?—I believe there are two submarine wires at work.

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1482. Was not it the case that during a portion of last winter only one was available?—I have no recollection of such being the case; as far as my knowledge goes there is one from Whitehaven to Larne, another from Port Patrick to Donaghadee, and another from Kingstown to Holyhead, but that third has been broken for a long time, so that there are only two available. The entire communication with Ireland comes through Belfast.

1483. If your arrangement is with one company, if anything happens to the submarine wire which that company works, I suppose the whole of your telegraphic intelligence is put a stop to?—If anything happens to that wire we cannot possibly have communication.

1484. You say there are two wires; your arrangement being with one company, if the wire worked by that company fails the whole of your intelligence comes to an end?—Both the wires, I believe, are in the hands of the Magnetic Telegraph Company. I am giving hearsay evidence now; but the general opinion is that those wires belong to the Magnetic Telegraph Company.

1485. Is it your opinion, from your knowledge of public feeling in Belfast, that this purchase by the Government would be looked upon as a great benefit to Ireland?—I do not think it is a case of special benefit to Ireland more than any other part of the United Kingdom.

1486. The more remote the district is from London, the greater the advantage to it of telegraphic communication?—Naturally so.

1487. Therefore the benefit to Ireland would be greater than to parts of the United Kingdom nearer to London?—The benefit to Ireland would be very considerable. As it is proposed to reduce the charge for special messages, it would be an advantage to those who take special messages, and also as it is proposed to reduce the price for commercial messages, it would be a great benefit to the mercantile public.

1488. Are the public of Belfast satisfied with the present telegraphic arrangements?—They are not satisfied with them.

1489. On what ground?—On the ground of irregularity.

1490. Is the rate in Ireland similar to that in Great Britain?—No; for a telegraphic message from London to Belfast the cost is 3s. for 20 words.

1491. What is the charge for a similar distance in this country?—I think 2s.

1492. Can you give any reason why there should be that difference?—I cannot; but they say that the submarine cable is the reason.

1493. Is there any greater expense in working a submarine cable than a land wire?—No greater expense in working it, but a greater expense in laying it down.

1494. Do you think that there has been an increase in the use of telegraphic communication in Ireland of late years?—I have no knowledge upon that subject.

1495. What is your opinion of the advantage to Ireland of the proposed uniform 1s. rate?—I cannot conceive, looking at it from a public point of view, that it can be otherwise than most beneficial. I think every facility for inter-communication should be established between the two countries, and that Ireland should be brought as much as possible into connexion with the United Kingdom, and therefore the more facilities in the way of communication we have the better.

1496. How many hours after the publication of the "Times" newspaper does it arrive in Belfast?—The earliest way by which it can arrive is by Dublin; coming by Dublin, it arrives at Belfast at four the following morning; that is to say, Monday's "Times" arrives in Belfast at four o'clock on Tuesday morning, but it is not available till the morning's delivery, between eight and nine.

1497. Are your Belfast papers published very early in the morning?—At five o'clock in the morning.

1498. What is the latest telegraphic news you are able to give?—The House of Lords divided at twenty-nine minutes to three on the Suspensory Bill, and that was published in the Belfast papers the next morning.

1499. Within four hours of the event, in fact?—Yes; it is not at all an unusual thing for me to see an announcement of the adjournment of the House fifty minutes after it has taken place.

1500. So that you are able to inform your readers of what has occurred within four hours after it has taken place?—Yes.

1501. If they had simply taken a London paper, they would not have known it for twenty-four hours afterwards?—That is so.

1502. Therefore a good system of telegraphic communication is of paramount importance to a place at such a distance from the metropolis?—It is of paramount importance to the north of Ireland, and of very great importance, but not of paramount importance, to Dublin; because the London papers arrive in the evening, so as to be available for the newspapers published the next morning. In the north of Ireland, without telegraphic communication, we could not give intelligence of what took place in London the preceding night.

It is plain from the foregoing extracts that the representatives of the Press, who appeared before the Committee, were dissatisfied with the then existing arrangements; that they were especially dissatisfied with the monopoly of collection possessed by

the Telegraph Companies, and that in their opinion the then existing arrangements tended to check the distribution of news by telegraph throughout the country. It is also clear that they approved of the provisions of the Bill then before the Committee, and thought that the effect of them would be, if they became law, greatly to increase the spread of news by Telegraph throughout the country, at an increased cost it might be to newspaper proprietors, but with a proportionate increase of advantage to them and to their readers.

In furtherance of their views, the following clause was inserted in the Telegraphs Act of 1868 :—

“Notwithstanding anything in this Act, it shall be lawful for the Postmaster General, with the consent of the Commissioners of Her Majesty’s Treasury, from time to time to make contracts, agreements, and arrangements with the proprietor or publisher of any public registered newspaper, or the proprietor or occupier of any news room, club or exchange room, for the transmission and delivery, or the transmission or delivery, of telegraphic communications at rates not exceeding one shilling for every hundred words transmitted between the hours of six p.m. and nine a.m., and at rates not exceeding one shilling for every seventy-five words transmitted between the hours of nine a.m. and six p.m. to a single address, with an additional charge of twopence for every hundred words, or twopence for every seventy-five words, as the case may be, of the same telegraphic communication so transmitted to every additional address: Provided always that the Postmaster General may from time to time, with the like consent, let to any such proprietor, publisher, or occupier the special use of a wire (during such period of twelve hours *per diem* as may be agreed on) for the purposes of such newspaper, news room, club, or exchange room, at a rate not exceeding five hundred pounds *per annum*: Provided also, that no such proprietor, publisher, or occupier shall have any undue priority or preference in respect of such rates over any other such proprietor, publisher, or occupier.”

Having shown what were the views and expectations of those who advocated the transfer of the telegraphs to the Post Office, I propose now to describe as briefly as circumstances will permit, the difficulties by which the Department was encountered in the prosecution of its undertaking.

These difficulties may be classed under the following heads :—

- E. Difficulties arising out of the very natural reluctance of the telegraph companies to extend the systems under their control so long as the proposal for the acquisition of those systems by the State was under consideration.
- F. Difficulties unavoidable at the outset of the undertaking, and arising out of the nature and magnitude of the change which was demanded by and promised to the public, and which was nothing less than a complete reorganization of the telegraphic system of the country.
- G. Difficulties attributable to the delay which took place in the passing in 1869 of the Money Bill which was required to give effect to the Act of 1868.

E.

Very little was done in the five years prior to the transfer towards the extension of the inland telegraph system.

In their report of the 30th January 1866, the directors of the Magnetic Company stated that “additional wires” (about 100 miles) “had been erected upon some of the main lines during 1865, but that their main object had been rather to develope and extend the traffic upon their existing telegraphs.” In the same month the directors of the United Kingdom Company reported that their mileage at the end of December 1865 was what it had been at the end of June 1865, and that they had opened but one additional office, “as they had given their attention almost exclusively to the consolidation and development of the existing system, which they intended to enlarge only where there was the best guarantee of a remunerative business.”

In January 1866, a severe storm, of almost unprecedented severity, destroyed many hundreds of miles of the English telegraphs. The damage was so great and the repairs were so costly, that the companies may well be excused for their abstinence from extensions during the year 1866. The Magnetic Company in that year increased their mileage of wire by 54 miles only, and the United Kingdom Company added but 146 miles.

The agitation for the transfer of the telegraphs began to take shape in 1866, and, as a matter of course, had a powerful effect upon all the companies. The Electric Company, which in 1866 increased its mileage by 2,500 miles of wire, added only 2,000

miles in 1867, and only 700 in 1868, and this additional mileage was placed mainly on existing lines of great importance. Hardly anything was done for the extension of the inland system in 1867 and 1868 by the other companies, and in 1869 no extensions were made save those which were carried out on behalf of and at the cost of the Post Office, and in view of the transfer.

At a recent meeting of the officers engaged in the telegraph branch of the Post Office, the proceedings at which meeting are described in the printed papers marked B, I took occasion to question the divisional engineers who were formerly officers of the telegraph companies upon this subject, and their replies which will be found at pages 233 to 240 of the printed papers were to the following effect: Mr. Sanger, formerly manager for the Magnetic Company in Ireland, stated that for two years and a half prior to the transfer "new works in Ireland were practically stopped. Mr. Preece, engineer of the Electric Company in the south of England, said that "new extensions had been stopped;" Mr. Graves, engineer of the Electric Company in the north and north-east of England, said "we kept that which we had in good order, but we spent "no money in acquiring that which we had not, for it was self evident that we were "going to get no return;" Mr. Walsh, engineer of the Magnetic Company for a large part of England, said "that he had orders to extend the wires to several manufacturing towns, but that in consequence of the probability of the Government taking "over the telegraphs he received instructions not to carry out these extensions;" Mr. Shaw, engineer for the United Kingdom Company throughout the kingdom, said "that his company spent nothing for extensions prior to the transfer, excepting upon "the land lines which they put up in connexion with the Danish and Norwegian "cables from which they expected a handsome return." Lastly Mr. Tansley, engineer of the Magnetic Company in Scotland, said "that there were no extensions in hand or proposed in Scotland for about four years before the transfer.

In short there can be no doubt that during five years prior to the transfer the extension of the telegraphic system in this country made very little progress, and that in the two years prior to the transfer it made no progress at all. During the whole of that time the public had been crying out for extensions, so that the Post Office started with a heavy arrear of work upon its hands, and heavily in debt to public expectation.

F. Difficulties arising out of the nature of the change required by and promised to the Public.

I think it must be evident to anyone who reads the foregoing remarks that the change demanded by the public and promised by the legislature was a sweeping and radical change; and that in carrying it out it was scarcely possible for the department to avoid giving some dissatisfaction to some classes of the community.

The telegraph companies declared in 1868 that their lines were used mainly by "stockbrokers, mining agents, shipbrokers, colonial brokers, racing and betting "men, fishmongers, fruit merchants, and others engaged in business of a speculative "character, or who deal in articles of a perishable nature."

It was their opinion, too, that "general merchants used the telegraph comparatively "little compared with those engaged in the more speculative branches of commerce." [Vide the pamphlet put forward by the Electric Telegraph Company in the spring of 1868.]

There is no reason to doubt the accuracy of this view. By maintaining high charges as long as they could, by reducing those charges inch by inch as it were, and only under pressure, by the confinement of their operations to important towns, and by planting their offices mainly in the business centres of those towns, the telegraph companies had brought speculative men, and speculative men only, to a *free* use of the telegraph. Whoever could make money on a turn of the market, whoever could advantageously place a few pounds when Bumblebee went below Dulcibella in the betting, whoever had it at heart to let Thames Street know that there was a large take of herrings at Wick, rushed cheerfully to the telegraph office, and would have submitted to any inconvenience, and paid any charge to get his message through in time. But the general public, puzzled by a variable and complex tariff, and disheartened by the distance of the telegraph offices from their doors, had got to regard the telegraph as a medium of communication which they might use in times of sore necessity, and then only, and to look upon a telegraph message with a feeling amounting to fear. This is within the knowledge of most people; it is certainly within my knowledge, and I firmly believe that for many months, perhaps even for some years, there will be a large

number of people who will be unable to open the envelope of a telegraphic message without alarm and apprehension.

Those who advocated the transfer to the Government contemplated a radical change in this respect. They proposed, by the establishment of a low, uniform, and very simple tariff, and by bringing the wires close to the population, to popularise telegraphs in this country, to put the use of the telegraph within the reach of everyone, and to make that, which had hitherto mainly served the purposes of the wealthy and the speculative, minister to all the necessities of social and domestic life.

On the introduction of such a system as this, it was absolutely necessary that the Post Office should set itself resolutely against favouritism of any kind, and that it should determine to forward messages strictly in order of receipt, and without any reference to their real or supposed importance, or to the wishes of the senders.

Applications have been made to the Department for the establishment of a differential tariff, with a low rate for ordinary and a high rate for special messages, but it is clear that no such differential tariff is possible. If it were once admitted that a message called special, and on which 5s. were paid, ought to go before a message called ordinary and on which but 1s. was paid, then it would be impossible to contend that a message on which a guinea was paid should not have priority over a message on which 5s. were paid. If the principle of strict rotation were once abandoned, the chief use of the telegraph would fall to the rich or to those whose wants, for the time being, made them as lavish as the rich.

I believe that the directors and managers of the telegraph companies aimed at sending the messages in strict rotation, but I cannot divest myself of the belief, although I cannot give any satisfactory grounds for my belief, that in some way or other good customers had a preference.

This, however, is quite certain, that good districts had a preference. In bad weather, when the wires were working ill generally, some companies would take care to keep a fair communication between important towns, even though by so doing they damaged a larger number of less important towns. As a matter of course the Post Office has endeavoured to deal with all parts of the country equally, to leave those wires undisturbed which were unaffected by weather, and to let those districts whose lines of communication were affected bear for the time the misfortune which had fallen upon them.

I believe that the course which the Post Office has pursued is fair, and that it is, on the whole, for the benefit of the community; but it was not to be expected that this course would commend itself to those whose interests were affected by it. When we undertook, by the establishment of a low tariff, and by the extension of the wires into outlying districts, to bring about a large increase in the number of messages, we were bound, as far as possible, to take care that the extension of the means of transmission kept pace with the extension of the business, so that those who had hitherto chiefly used the telegraph should suffer no loss of accommodation. I shall presently have to show how it was that we were unable, at the outset of our undertaking, to do all that we had planned and desired to do in this respect. I shall content myself now with stating that I am confident our operations have given great satisfaction to large numbers of persons throughout the country, who having no special motive to declare their satisfaction have kept it to themselves, and that a very large part of the dissatisfaction which was at first expressed, and which is now fast dying away, came from that which had hitherto been as it were a privileged class.

It will be remembered that, when penny postage was first introduced, many men of business complained that they gained nothing, but rather lost by it. They said that no doubt the previous charges had been high, but that the burden had not fallen on them, as they had for the most part charged their customers a lump sum annually for postage, which had saved them from loss, if indeed it had not left them a profit. Something of the same kind has happened now. The Post Office has benefited the community generally; for a time, and I believe only for a short time, it injured a class. I am certain that before long even the injured class will be ready to acknowledge that, on the whole, it too has derived benefit.

On the whole, then, the transfer to the Government involved these practical difficulties:—

- (a.) Having undertaken by the establishment of a low tariff, and the erection of feeders to the main lines, to swell the traffic on those main lines, it was absolutely necessary that the means of communication on the main lines should be extended and improved.

- (b.) Having undertaken to effect a separation between the commercial system and the railway system, it was absolutely necessary to supply the railways with a large mileage of wires, 5,000 or 6,000 miles, in substitution for those wires of which there had been a joint user, to provide fresh instruments in lieu of those left at the railway stations, and to take care that the Railway Companies were provided with the proper force for working the wires which were left to them.
- (c.) Having to take over the staff of several Companies it was necessary to amalgamate into one force men who had hitherto regarded each other as rivals, and who had in many cases worked on totally opposite plans and with different instruments. Further it was necessary to amalgamate this combined force with the employés of a Government Department, and to assimilate practices so much at variance with each other as those of a public office and Commercial Companies.

G.—Difficulties attributable to the delay which took place in the passing in 1869 of the Money Bill, which was required to give effect to the Act of 1868.

It was provided by the Telegraphs Act of 1868 that unless another Act were passed in that or the next session of Parliament, putting at the disposal of the Postmaster-General such monies as should be requisite for carrying into effect the objects and purposes of the Act of 1868, the provisions contained in the last-named Act should be null and void.

From this it followed as a matter of course that until the Money Bill was passed the Post Office could make no other preparations than preparations on paper for the work which it had to do.

In the winter of 1868-9 grave doubts were raised by a writer in the *Edinburgh Review*, and by some other writers in the public prints, as to the bargain with the Telegraph Companies which had been sanctioned by the Act of 1868. It was for some time doubtful whether the Money Bill would be introduced. Nor was it possible for the Government to come to a decision on the subject until the result of the arbitrations and negotiations under the Act of 1868 was known. It was not until July of 1869 that the Money Bill was introduced. When it was introduced it met with some opposition, both in Committee and in the House, and it was not until August the 9th that it became law. Up to that time the Post Office could not spend one shilling for the prosecution of its undertaking; could not invite a tender for materials, even though such materials might require months of preparation; and could not get the advice or assistance of the practical officers of the Telegraph Companies, who, though their advice and assistance were indispensable to the Post Office, were bound in the interests of their employers to withhold them so long as the issue of the long pending proceedings was doubtful.

As I have before stated the Post Office was heavily in debt to public expectation, and under strong pressure to mount the new system without delay. The plans of the Department were complete, so far as completion was possible at that time; but for the effectual completion of the work a large amount of out-door work was required, at a time when the autumn was at hand, and the winter fast coming on. Further, the stores required for the work could not be obtained with sufficient rapidity; to have obtained them in sufficient quantities at the time it required them, the Department ought to have been in a position to order them six months before. The following statement of the stores supplied to the Department in 13 months from the 1st October 1869 will show what our requirements were, and will satisfy any one who is acquainted with the subject that the difficulties which we had to encounter in this respect were great.

STATEMENT OF GALVANIZED IRON WIRE, GUTTA PERCHA COVERED WIRE, ARMS, BRACKETS, SADDLES, INSULATORS, POLES, INSTRUMENTS, and BATTERIES supplied to the Department for the Erection and Maintenance of Telegraphs, from 1st October 1869 to 31st October 1870.

	Galvanized Iron Wire.	Gutta Percha Covered Wire.	Arms.	Brackets.	Saddles.	Insulators.	Poles.	Instruments.	Batteries.
	tons. cwt. qrs. lbs.	miles. yards.							
Per the Electric and International Telegraph Company.	119 12 0 17	457 614	45,088	27,016	29,651	138,656	6,012	30	322
Per ditto ditto, supplied under contract.	1,404 1 3 19	—	—	—	—	—	14,698	1,253	6,202
Per the British and Irish Magnetic Telegraph Company.	3 10 0 12	65 23	502	404	20,112	76,924	4,355	—	2
Per the United Kingdom Telegraph Company.	0 5 0 20	—	12,754	—	—	18,862	1,706	—	75
Per sundry Manufacturers subsequent to the Transfer.	1,855 1 3 18	1,442 560	228,607	28,898	6,595	488,075	73,121	2,222	8,771
Totals - - -	3,382 11 1 2	1,964 1,197	286,951	56,318	56,358	722,517	99,892	3,505	15,372

When, after describing the results of the work which we have done, I come to describe the manner in which it was done, I shall have further occasion to dwell upon these difficulties.

4. Having now pointed out what were the views and desires of those who advocated the transfer of the telegraphs to the Government, and having stated the difficulties with which the Post Office has had to contend, I propose to state broadly what the Post Office has been able to do for the public up to the present time, and then to describe the mode in which it has carried out the various branches of its undertaking.

The Post Office has done all that it undertook to do as regards reduction and simplification of tariff; much of what it undertook to do in respect of extensions; all that it undertook to do towards separating the commercial system from the railway system; and very nearly all, if not quite all, that it undertook to do on account of the press.

It could not accomplish all these objects at once, or, indeed, very rapidly; in striving to attain them it could not avoid subjecting many senders of messages for a time to annoyance and inconvenience, and probably from two to three months must elapse before it can hope to give entire satisfaction to those who, prior to the transfer, made the most frequent use of the telegraphic system. But, as the following pages will show, it has done a great deal, and is still doing much for the public benefit, and has spared neither pains nor expense in its attempt to organise a perfect telegraphic system.

TARIFF.

The uniform shilling rate established by the Act of 1868 now applies to all the telegraph lines in the United Kingdom, the line to Scilly and the lines to Orkney and Shetland excepted. It also applies to the lines between England and the Channel Islands and England and the Isle of Man. These last-named islands, not being part of the United Kingdom, were not included in the provisions of the Act of 1868, but have been brought within the scope of that Act by an Act passed in the last session of Parliament. The lines to Scilly, Orkney, and Shetland are worked by private companies under license from the Postmaster-General, and the companies' rates are charged in addition to the Post Office rates. When the companies in question first proposed to lay down the cables to Scilly, Orkney, and Shetland, the Department did not desire, for various reasons which need not be specified here, to enter upon undertakings which seemed to involve a very considerable amount of extra risk and difficulty. It did not, however, think fit to prevent others from affording the accommodation, and accordingly gave the companies a license to act. Sooner or later, however, these lines will have to be brought into the Government scheme.

With these exceptions the uniform rate, as I have stated, applies to all telegraph lines in the United Kingdom, and to the lines to the Channel Islands and the Isle of Man. From a carefully prepared account which has been taken of the produce of all messages during the week ended the 17th September last, it appears that the average

cost to the public of an *inland* message is between 1s. 1d. and 1s. 1½d. The Post Office share of the cost to the public of a foreign message is so much higher as to bring the average produce to the Post Office of 1,000 messages of all kinds up to 58l. 7s. 3d., which is at an average rate of 1s. 2d. per message; but the average cost to the public and average produce to the Post Office of an inland message is, as I have stated, between 1s. 1d. and 1s. 1½d.

This average cost includes all extra charges for portorage beyond the free delivery, or for any other extra service. It has been ascertained that the corresponding average cost to the public prior to the transfer was 1s. 7d.; so that the average cost, to those who used the telegraph prior to the transfer, of an inland message has been reduced by nearly one-third.*

This reduction is partly to be attributed to the substitution of an uniform rate for all the formerly prevailing rates, and partly to the extension of the wires by which the charges for portorage have been reduced.

A glance at the ordinary form for inland messages, of which the following is a copy, will satisfy every one that the simplification of the tariff has been almost as advantageous as the reduction of the tariff:

A. POST OFFICE TELEGRAPHS.										No. of } Message. }												
Prefix -	A.M.	P.M.	WORDS TO BE SIGNALLIED.		CHARGE.						Counter Clerk to write M. M. Instructions here. Office of Origin _____ The charges for transmission, portorage, &c. are, as far as is possible, to be paid by postage stamps affixed below. The stamps must be cancelled with the Office Stamp. N.B.—The Message must be dated either with the Office Stamp, or in writing.											
Received at -			In Addresses (free) -	In Telegram (charged)	In Instructions -	Total -	Counter Clerk to sign here.	Telegram -	Repeating -	Reply -			Excess in R.P. -	Extra Copies -	Re-direction -	Portorage -	Special Charges -	Total -	How paid.			
Code Time -																			In Stamps -		s.	d.
Sent at -																			In Money -			
To the Office at }																						
By me _____																						

The blank spaces above are for use by the Officers of the Post Office only, and the Public are requested not to write in or over them.

FOR INLAND TELEGRAMS ONLY.

It is particularly requested that the Message may be written distinctly. Numbers must be written in words.

Name and Address of the Sender of the Telegram. Addresses free. Name and Full Address of the Person to whom the Telegram is to be delivered.

From _____ To _____

In each of the spaces below, one word only should be written. The first five words of the Message should be written in the five spaces into which the line is divided, and so on. When the Message is in excess of forty words, the additional words may be written on ordinary paper attached to the Message Form by pin, or wafer, or gum.

Words.	Charge.						
20	1/						
25	1/3						
30	1/6						
35	1/9						
40	2/						

When the Sender desires the Telegram to be delivered by LOCAL POST, the subjoined Form is to be filled up.

I REQUEST that this Telegram may be forwarded by Post from the Terminal Telegraph Office of the Post Office.

Signature.

When the Sender desires the Telegram to be delivered by SPECIAL MEANS other than those mentioned in paragraph 10 at back of Form, the subjoined Form is to be filled up.

I REQUEST that this Telegram may be forwarded by _____
[here describe the special means] from the Terminal Telegraph Office of the Post Office, and I have deposited _____ Shillings for that purpose.

Signature

No such form was possible prior to the transfer, and under the operation of a tariff based partly on distances and partly on routes. Then very few but practised senders

* As a matter of course the average cost prior to the transfer would not have been so low as 1s. 7d. if the high rates for long distances had not kept down the number of messages liable to such rates.

of messages could know without inquiry what the cost of a given message would be. Now any sender of a message can reckon the cost as he writes it. The result is that a considerable proportion of the messages are brought to the offices ready written and paid for by means of stamps.

The Department has done its best to encourage this by supplying those who habitually send many messages with interleaved books of stamped message forms, on which it prints the names and addresses of the senders, and in some cases of the receivers also.

A list of the firms for whom such message forms have been printed is given in paper C: So, also, I may mention here, it provides envelopes, with printed addresses, for those who receive many messages. Paper D. will show that upwards of 7,000 messages are sent out daily in envelopes with printed addresses.

EXTENSIONS.

In describing the extensions, I propose to deal first with our extensions from the centres to the suburbs of large towns, or in other words with the local systems which we have established in large towns. The following maps, 12 in number, show the relative positions of the telegraph offices under the companies, and the relative positions of the postal telegraph offices at present, in Liverpool, Manchester, Edinburgh, Birmingham, Leeds, and Glasgow. They prove conclusively that, so far at least as the towns named are concerned, the Post Office has carried out its undertaking to put the wires within an easy distance from the population. In the plans, showing the relative positions of the offices under the telegraph companies, the offices of the Electric Company are coloured red, those of the Magnetic Company black, and those of the United Kingdom Company yellow. The scale is not uniformly the same for all the towns, but as a matter of course, each pair of maps is drawn to one scale.

•
Seaford

• *Walton*

Booth •

• *Lodwick*

LIVERPOOL.

PLAN

*Shewing the relative positions of the present
Postal Telegraph Offices*

Scale 3 inches to a mile.

• *Athol Street*

• *Regent Road*

Anfield
•

•
Scotland Road

• *Breck Road*

• *Everton Road*

West Derby
•

Tythe Barn St

• *R.S.*

• *Byrom Street*

• *West Derby Road*

• *Exchange*

• *Brunswick Road*

• *Water Street*

Lime Street
•

• *Corn Exchange*

• *Pembroke Place*

• *Kensington*

H.P.T.O



• *Ranelagh Place*

• *Bold Street*

Oxford Street •

• *Edge Hill*

• *St George Street*

• *Upper Parliament Street*

Brunswick

• *R.S.*

• *Park Place*

Wavertree •

● *Canada Dock*
M

● *North Docks*
M

LIVERPOOL .

PLAN

*Shewing the relative position of Telegraph
Offices before the Transfer*

Scale 3 Inches to one Mile.

● *G^t Howard Street*
M

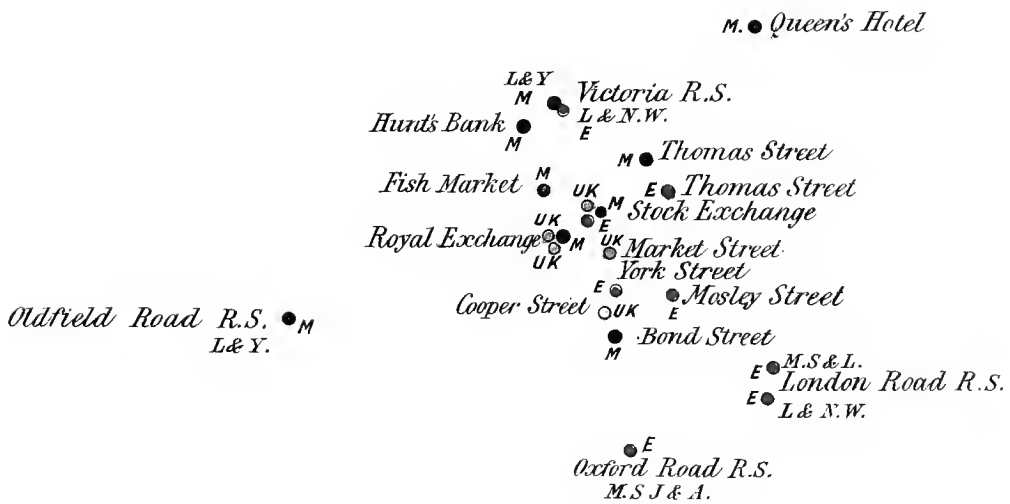
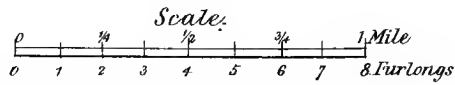
● *Tythe Barn Street R.S.*
M
● *Exchange.*
E M
● *Rumford Street*
M
● *Water Street*
E
● *Castle Street*
E
● *Lime Street R.S.*
E
● *Lord Street*
U K
● *Lime Street*
U K
● *Adelphi Hotel*
M
● *Hanover Street*
U K

● *Brunswick R.S.*
E

MANCHESTER

PLAN

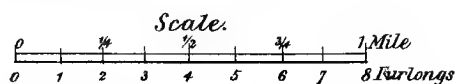
*Shewing the relative position of Telegraph
Offices before the Transfer*



MANCHESTER

PLAN

*Shewing the relative positions of the present
Postal Telegraph Offices.*



● *Cheetham Hill*

● *Queens Road*

● *Strangeways*

● *Red Bank*

● *Lower Oldham Road*

● *Pendleton*

● *Victoria R.S.*
● *L&Y.* ● *L&N.W.*

● *Thomas Street*

● *Fish Market*

● *Stock Exchange*

● *Salford*

● *Ducie Blg's*

● *H.P.O.*

● *Deans Gate*

● *H.P.T.O.*

● *Piccadilly*

● *Mosley Street*

● *Gt Ancoats*

● *St Peters*

● *M.S & L*

● *London Road R.S.*
● *L & N.W.*

● *Regent Street*

● *Knott Mill*

● *Oxford Road*
● *R.S.*
● *M.S.J & A*

● *Ardwick*

● *Chester Road*

● *Oxford Road*

● *Stretford Road*

● *Moss Side*

● *Old Trafford*
● *R.S.*
● *M.S.J & A.*

● *Rusholme*

● *Granton*

Charlotte P

Haymark
● *N.E*

● *Granton Harbour*

EDINBURGH

LEITH ●

PLAN

*Shewing the relative positions of the present
Postal Telegraph Offices*

Scale 3 inches to a mile.

● *Stockbridge*

Hanover Street ●

George Street ●

H.P.T.O.

● *Waverly R.S.*
N.B.

● *Holyrood*

Charlotte Place ●

● *Parliament House*

Corn Exchange ●

Haymarket R.S.
● *N.B.*

● *Princes St R.S.*
Cal.

● *Newington*

Boroughmuirhead
●

Granton Harbour
●*E*

EDINBURGH

UK
●*E* ●*M* LEITH

PLAN

*Shewing the relative position of Telegraph
Offices before the Transfer*

Scale 3 Inches to one Mile.

Hanover Street UK ● ●*M*
●*E* ●*Princes Street*

●*Parliament House*
●*E* ●*Corn Exchange* ●*E*

BIRMINGHAM.

PLAN

*Shewing the relative position of Telegraph
Offices before the Transfer*

Scale 2 Inches to one Mile.

U.K. ● Soho. (Facing London Works.)

E ● Soho. L.&N.W.R. ½

M ● G.W. Hotel.

New Street ^{*M*}
Exchange Bldgs. ^{*E*} ● ^{*U.K.*}
New S. & R. S. ● ^{*E*} ● ^{*M*} *Corn Exchange*
New Canal S. & R. S. ● ^{*E*} ● ^{*M*} *New Canal S. & R. S.* ^{*E*} ● ^{*L.&N.W.R. ½*}

BIRMINGHAM.

PLAN

*Shewing the relative positions of the present
Postal Telegraph Offices*

Scale 2 inches to a mile.

● *Heath St^e Soho.*

● *Newtown Row.*

● *Constitution Hill.*

Barker St^e. ●

● *Parade.*

● *Snow Hill.*

● *Aston St^e.*

Cannon St^e

⊙ *H.P.T.O.*

●
H.P.O.

● *Exchange.*

Five Ways. ●

● *Horse Fair.*

● *Deritend.*

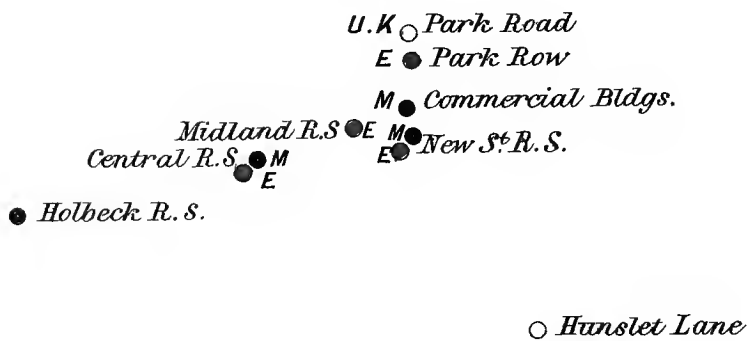
● *Bristol Road.*

LEEDS

PLAN

*Shewing the relative position of Telegraph
Offices before the Transfer*

Scale 3 Inches to one Mile.



LEEDS

PLAN

*Shewing the relative positions of the present
Postal Telegraph Offices*

Scale 3 inches to a mile.

● *Hyde Park Corner*

● *Sheepscar*

● *Woodhouse Lane*

● *Kirkstall Road*

● *Park Road*

● *North Street*

H.P.T.O.

● *Stock Exchange*

Central R.S. L&Y ●
G.N. ●

● *Midland R.S.* ● *Corn Exchange* ● *Marsh Lane*
● *New S. R.S.*

New Wortley ●

● *Holbeck R.S. G. & N.*

● *Holbeck*

● *Hunslet*

GLASGOW.

PLAN

*Shewing the relative position of Telegraph
Offices before the Transfer*

Scale 3 Inches to one Mile

Hillhead
UP ●

Charing Cross
U.P. ●

Buchanan St R. S.
E ● (Cal^y)

St Vincent Street
E ●

St Vincent Place
UP ●
E ●
M ● Stock Exchange
UK ●

Jamaica Street ● UK

Bridge Street R. S.
UP ● E ●
M ● (Cal^y & G. & S.W.)

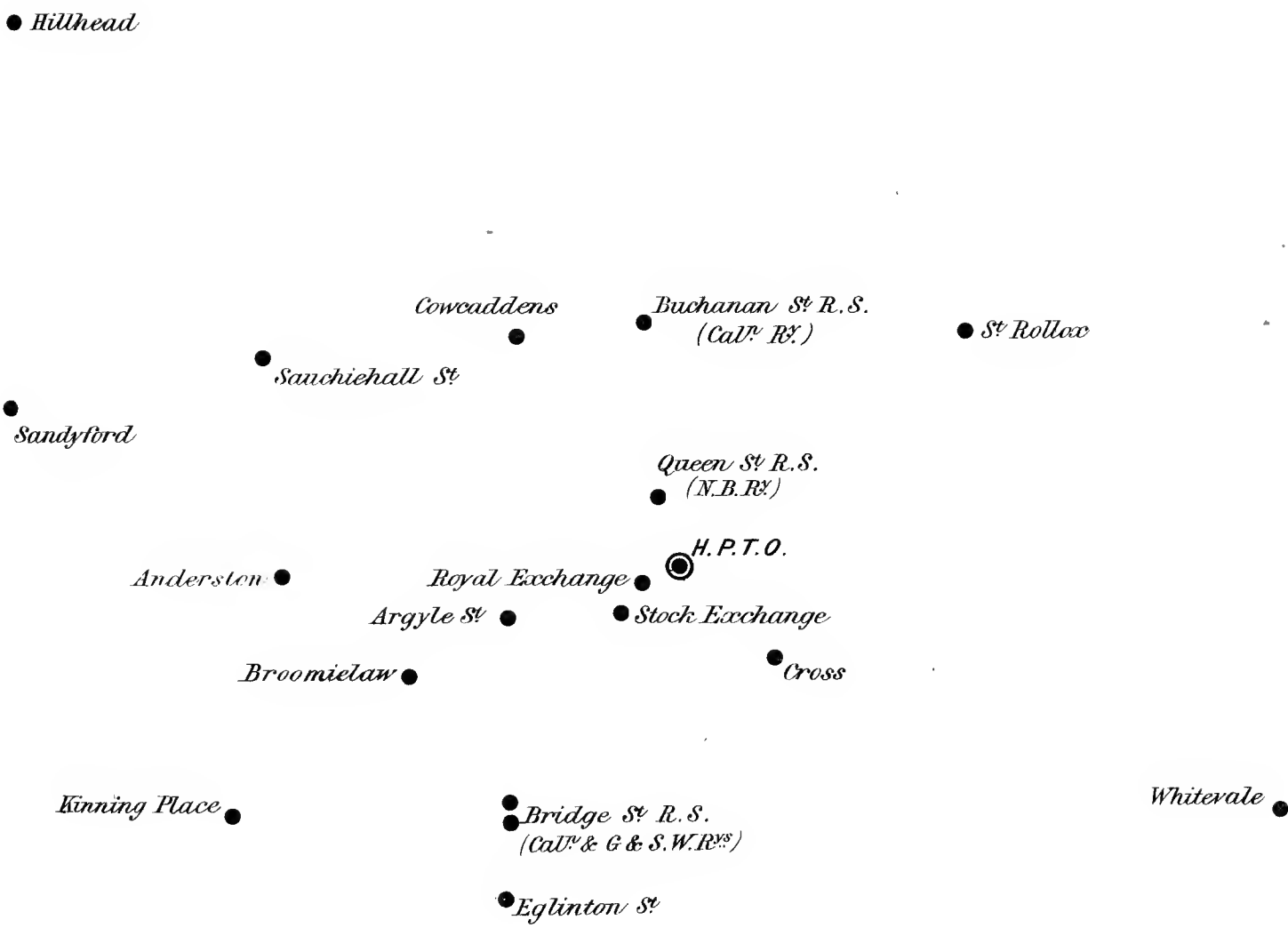
South Side R. S.
(Cal^y) ● E

GLASGOW.

PLAN

Shewing the relative positions of the present
Postal Telegraph Offices

Scale 3 Inches to a mile.



That the public appreciate the accommodation which the Department has thus afforded them may be gathered from the statement that 9 per cent. of all the messages handed in at Glasgow, 11 per cent. of all those handed in at Edinburgh, 14 per cent. of those handed in at Birmingham, 17 per cent. of those handed in at Leeds, 26 per cent. of those handed in at Liverpool, and nearly 40 per cent. of those handed in at Manchester, are handed in at the stations which the Post Office has set up, in districts previously unprovided with accommodation, in substitution for the duplicate and triplicate offices which it has closed. As a matter of course the extensions have been as serviceable to the receivers as to the senders of messages.

The offices in the local system shown in the foregoing maps are all in communication with the head offices of their respective towns. A careful watch is kept from day to day upon the transmission of messages between the head and branch offices, and whenever it is found that the work of any particular circuit is impeded by the fact of there being too many offices on it, or by the fact of some one office on a circuit being exceptionally busy, steps are taken at once to provide additional wire accommodation. This has been done more than once since the transfer, at Liverpool, Manchester, Leeds, Edinburgh, Birmingham, and Glasgow.

The busiest branch offices in Liverpool, Manchester, Birmingham, and Glasgow are connected with the head telegraph offices by pneumatic tubes. The pneumatic tube system has been extended in the three first-named cities by the Post Office, but has been introduced into Glasgow for the first time by that Department. It is about to be introduced into Dublin, where the local system is advancing towards completion.

Much has been done to extend and improve telegraphic facilities in the immediate neighbourhood of other large towns, such as Bristol, Hull, Sheffield, Bradford, Derby, Nottingham, and Brighton. The last-named town affords a good illustration of the plan upon which the Post Office has proceeded. The chief thoroughfares of Brighton consist of two long lines running from east to west, parallel with the sea. The telegraph companies had planted offices on convenient points on the thoroughfare nearest to the sea, which is of course the most important of the thoroughfares, but the Post Office, whilst it has maintained the full accommodation on this thoroughfare, has also opened offices at convenient points on the other line, to the great advantage of the public.

LONDON.

Without the aid of a map it is hardly possible to convey any adequate idea of the extent and completeness of the telegraphic system in London. A map will be prepared as an adjunct to this report; but the following statement will show the number of stations which have been provided for each district of London, and the number of messages collected for transmission by each district. The statement is based on a return taken in the week ended the 17th September.

Name of District.	Number of Telegraph Stations in District.	Per-centage of Messages collected for Transmission by each District.
East Central - - -	43	64.05
Western - - -	53	8.93
West Central - - -	19	7.19
South Western - - -	44	5.96
South Eastern - - -	37	4.81
Eastern - - -	32	3.25
North Western - - -	25	2.99
Northern - - -	32	2.82
	285	100

Fifty additional offices have been opened since the return on which the foregoing statement is based was taken; but this circumstance would not materially alter the proportions of the traffic. It is probable, however, that as the return was taken after the close of the London season it does not give a fair view of the amount of business done in the Western and South Western Districts.

The offices in the East and West Central Districts, 62 in number, are all in direct communication with the central station in Telegraph Street.

The communication with the Threadneedle Street, Stock Exchange, Lothbury, Leadenhall Street, Fenchurch Street, Cornhill, Gresham House, St Martin's-le-Grand, Royal Exchange (Lloyd's), the Baltic, the Old Broad Street (British Indian), and Temple Bar offices, is by means of pneumatic tube. Occasion will be taken hereafter to revert to the subject of these tubes.

The following statement shows the number of offices actually open in each district on the 31st December 1870, and the number habitually in direct communication with the central station in Telegraph Street. The offices not habitually in direct communication with the central station can, and in practice frequently are, put in communication with that station by means of a mechanical arrangement known as the Umschalter switch :

Name of District.				Total Number of Stations open on 31st December 1870.	Number in direct Communication with Telegraph Street.
East Central	-	-	-	41	41
Western	-	-	-	63	14
West Central	-	-	-	21	21
South Western	-	-	-	52	9
South Eastern	-	-	-	46	8
Eastern	-	-	-	40	9
North Western	-	-	-	32	6
Northern	-	-	-	39	7
				334	115

The following are the most important collecting offices in the London Districts, ranged in order of importance :—In the East Central, the Stock Exchange, Fenchurch Street, Gresham House, Leadenhall Street, Cornhill, and Lothbury offices ; in the West Central, the West Strand, West Central District, Somerset House, and Covent Garden Market offices ; in the Western, the Piccadilly Circus, Western District, and Paddington offices ; in the South Western, the St. James Street, Parliament Street, and Knightsbridge offices ; in the South Eastern District, the Borough and Crystal Palace offices ; in the Eastern District, the Aldgate, Shoreditch, and St. Katherine's Dock offices ; in the North Western, the Euston and Camden Road offices ; and in the Northern, the Kings Cross and the Cattle Market offices. The messages collected at the postal telegraph stations in London are about 20 per cent. of the whole number of messages collected at all stations throughout the United Kingdom, and of them about 20 per cent. (averaging 5,000 per week) are local messages, that is, messages handed in in one part of London for delivery in some other part of London. The local systems established in other large towns have not as yet created a *local* traffic in those towns, but serve merely as feeders to the main lines.

It is believed that the working of the local system in London has given great and general satisfaction. Certainly no pains have been spared to make it perfect. The circuits have been watched from day to day, and additional wire accommodation has been given whenever it has been found that messages were delayed for want of it. Indeed the mileage of wire, of which the local system in London is composed, has been increased by 50 per cent. since the transfer. At the meeting to which I have already referred, and the proceedings at which meeting are described in Paper B., Mr. Baines pointed out (at page 243) that in many cases we had since the transfer doubled and even trebled the previous means of communication ; and Mr. Isherwood, who was formerly the engineer to the London District Telegraph Company, stated (see page 242) that prior to the reorganisation of the system "the messages in London were in the habit sometimes of taking hours in reaching their destination, but that they are now delivered within an average of 10 minutes." The acceleration is attributable partly to the multiplication of wires, and partly to the extension of the wires towards the population. The following remarks which were made by Mr. Isherwood, and are also to be found at page 242 of Paper B., will show that the plans of the Department in London are almost complete.

"The whole of the town portion of the metropolitan system, I should say, is now complete, with the exception of about two offices on the Duke of Bedford's estate, which is waiting for his consent. The Western, North Western, and Northern are also complete, including the whole of the suburbs. In the eastern we have reached nearly to the extreme points ; but we have North Woolwich, Millwall, and a few stations beyond Stratford, some of which we are nearly ready to open. The South Eastern offices are

nearly all ready, or at least the orders have been given to one or two railway companies to extend the wires. The whole of Woolwich will be shortly ready and the other stations will be done, I should think, in about the course of a month or six weeks. In the South Western district we are rather behind-hand, and there are some difficulties arising in respect to poleing the road on some important part of the line. I have no doubt that we shall be able to say that that will be completed in the course of two months. In the Northern and Eastern districts we have pushed a little beyond the metropolitan districts, having reached Enfield, and now got as far as Waltham Cross, and we also intend to go as far as Romford. But it will be a question for the Secretary's decision as to whether this metropolitan system should not be extended to a large number of towns beyond the city and metropolitan district."

With reference to the concluding sentence of these remarks, I may observe that in my opinion the metropolitan local system must eventually be extended to all those places in the vicinity of London in which a large number of persons carrying on business in London are resident.

The Extension of the Wires from Railway Stations lying outside of Town Populations to Post Offices in the centre of such Populations, and the Extension of the Wires from Towns into Rural and other Districts unprovided with Telegraphic Accommodation.

The full amount of what the Department has done in this respect cannot be shown without the aid of maps, and maps will accompany this Report, on which the position of all the postal telegraph offices in the kingdom, reckoning the large towns as having but one office each, will be shown to the latest date. But it may be stated generally that the aim of the Post Office having been from the first to accommodate the greatest possible number of separate localities, it opened on the 5th February about 1,007 postal telegraph offices, each of which was at a post office serving a distinct locality, and in the centre of the population of that locality. It may be also stated that between the 5th February and the 31st December 1870 it succeeded (in spite of the circumstances which compelled it to employ a large force on the construction of new and the improvement of old main lines) in opening upwards of 900 additional offices for the accommodation of as many distinct localities. And, further, it is proceeding with this work at the rate of from 20 to 30 additional offices per week, and has at this moment upwards of 96 offices, which wait either for clerks or instruments to be opened.* The whole of the postal telegraph offices now open, and which are nearly 2,000 in number, are served by wires which are used solely for commercial purposes, the railway and commercial systems having been completely separated.

Telegraphic business, however, is carried on on behalf of the Postmaster-General at upwards of 1,800 railway stations, so that travellers and persons resident in the immediate vicinity of the railway stations have lost none of the advantages which they possessed prior to the transfer, though, as I shall show presently, they make but little use of those advantages.

It must not be supposed that this great and general extension of the wires has been effected without great difficulty. The Department would gladly have devoted the whole of its attention and the whole of its engineering force to the construction of new, and the reinsulation and rebuilding of old main lines of great importance, but the demands of the public for branch extensions have been so numerous and so urgent that it has been forced to carry on the two works simultaneously. As a matter of course those districts which the companies had most neglected, and in which the Post Office was most in arrear to public expectation, have been most pressing in their demands for further accommodation, and, equally as a matter of course, the difficulty of giving the additional accommodation has been greatest in these very districts. Efforts have been made to serve all districts fairly and impartially, but the accommodation given to some districts, though it is greater than that given by the companies, still falls short of that planned for it by the Department. The north and centre of Devonshire, the central parts of South Wales, some parts of North Wales, a large part of the North Riding of Yorkshire, and many parts of Scotland, more especially in the north and west, have still much to receive at the hands of the Department. But something has been done in all parts of the kingdom, whilst a very large amount of work is still in course of execution.

I shall have before the close of this Report to make a concise statement of the additional mileage of wire erected, of the mileage of line renewed and restored, and of the additional instruments procured for the purpose of improving accommodation on main, and extending it over branch lines; but I should hardly do justice to those who have worked with me, and who have given to the work an almost incredible

* One hundred and six extensions are in progress, and one hundred and sixty-eight are ordered for early extension.

amount of labour and patience, if I did not allow them to state in their own words what each of them has done. At the meeting, to which I have more than once referred, the divisional engineers thus described the work done and being done in their several districts :—

Mr. Sanger, formerly manager for the Magnetic Company in Ireland, and now divisional engineer for the Department in that country, said :—

“ Prior to the transfer taking place there was nothing done in Ireland except the amalgamation of the offices at places where the Magnetic and the Electric Telegraph Companies competed. Since the transfer 595 miles of line have been renewed, comprising the examination and part re-insulation of about 2,400 miles of wire ; 2,042 miles of new wires on existing poles on railways have also been erected, and 234 miles of line on roads in the shape of loops between the railway stations and post office, making a total of 2,276 miles of new wires. There still remains a mileage of 842 miles on railways to be erected to complete the wires to be erected under specifications, and special wires authorised to accommodate the increasing traffic and the separation of the railway from the commercial system. All this work will be finished by the early spring, and we shall then be ready to go on with the erection of 2,000 miles of road lines to complete the system, which will, I think, be considerably advanced by the end of 1871. With regard to the extensions to be first commenced on roads, Mr. Baines and I made a report to the Secretary, which was approved, and I shall proceed with the execution of that work as soon as possible. Amongst other extensions there set forth are the lines to Donegal, Tuam to Hollymount, Galway to Clifden, Larn to Glenarm and Cushendall, Kilkenny to Kenmure, Clonmel to Lismore, and Clonmel to Fethard. Amongst the important works which have been executed in Ireland since the transfer there has been a nearly complete renewal and re-insulation of the Anglo-American telegraph line between Waterford and Valentia, a distance of 170 miles, and I believe I may state with perfect truth that there is not a finer line in the country than that is at the present moment. Amongst miscellaneous work which has been done has been the reconstruction and raising of the Belfast Street wires—a heavy job ; the erection of new street wires in Limerick ; Cork, tunnel wires replaced by covered work ; and a variety of other matters too numerous to mention. Though not done by me, I should mention also, as it forms part and parcel of our communication with Ireland, that a new four-wire cable has been laid between Donaghadee and Port Patrick for the purpose of improving the communication with Scotland ; and also a new four-wire cable from Valentia to the main land, thus securing on a firm footing the communication between London and Valentia. It is also contemplated to lay a new Irish cable between Holyhead and Howth. When that is done, which will be about the 1st of January, we shall have, excluding one spare wire, and two wires which are used by the Anglo-American Telegraph Company, 19 wires between Great Britain and Ireland, which will, I think, prove amply sufficient for the expansion of the traffic, and for any traffic which may hereafter accrue. The following apparatus has been sent to Ireland, and a great deal of it fixed : 327 single needle instruments, 68 inkers, 272 sets of acoustic instruments, 24,636 battery cells, and 496 descriptions of other apparatus. Though the work is not yet commenced we have prepared the plans, which have been approved, for the laying of an underground system of telegraph in Dublin, in the place of present overground wires. This involved a large amount of labour and great care and consideration, and will cost the Department several thousand pounds, but will render the communication in Dublin quite secure, which it is not at present. The wire and pipes are on the way, and the officer in charge of the work will commence the moment they arrive. Pneumatic tubes are already ordered, and will be laid between the College Green office and the head office in Sackville Street ; also between the head office and the branch offices at the Four Courts and the Custom House. In Cork the underground system is to be greatly extended, and new wires laid. The order for the work has been issued, and the work will be commenced as soon as possible.”

Mr. Preece, formerly an engineer of the Electric Company, and now engineer of the Department in the south of England, said :—

“ Now, with respect to my division, I may say that we had succeeded in opening at the time of the transfer 190 stations. We have opened since the transfer 137 stations, leaving now 327 stations open to the public. There remain to open 280 stations, of which 59 are in the south-eastern sub-division, 101 in the western, and 120 in the central. The renewals conducted since the transfer have been these: all the road wires passing through Rochester, Canterbury, and Dover, and from Battle to Beachy Head and Brighton, have been partially renewed. The road lines from Gloucester, through Bristol to Exeter and Plymouth, have been completely renewed, and other smaller lines, which make up a total of 200 miles of road lines which have been completely renewed. Immediately after the transfer the delays and the increase of business proving to us that considerable addition was required to the already overcrowded wires, we erected additional wires from London to Gravesend, to Margate, to Windsor, to Aldershot, to Epsom, to Portsmouth, to Bath, to Bristol, and to Exeter. A wire was erected from London to Penzance, to meet the Falmouth and Gibraltar cable. A wire was erected from London through Exeter to Salcombe, to meet the French Atlantic, and between Exeter and Salcombe to serve the new Channel Islands cables. Wires are also being erected now from London to Margate, to Bristol, to Maidstone, to Tunbridge Wells, to Brighton, from Brighton to Portsmouth, from London to Portsmouth, from Southampton to Bournemouth, from Bristol to Wells, and from Exeter to Totnes ; and various other small circuits are being extended in different directions. The construction works which we have in hand consist of a main trunk line from London, through Sevenoaks and Tunbridge to Beachy Head, several extensions in the Channel Islands, 13 wires on new poles from London to Oxford, over the Great Western line, to meet the extensions being carried out in the North Western division to meet the requirements of Ireland, and a considerable addition to the circuits in and around Bristol is about to be commenced. Since the transfer 109 separate works, involving additional street works, change of circuits, and other works of that kind, have been carried out. I anticipate to be able

to commence the 280 extensions which have to be carried out early in the spring, and I hope to make considerable progress before the end of the year, although I do not think that we shall be able to complete all the extensions that we have contemplated until the summer or the autumn of 1872. I may also add that Mr. Baines and myself are commencing an investigation of all the arrangements of circuits throughout my division, and I have no doubt that the result of that investigation will lead to a considerable alteration and addition to the circuits, which will still further throw work upon our hands during the ensuing summer."

Mr. Graves, formerly an engineer of the Electric and now an engineer of the department in the north-west and west of England, said :—

"The chief works that have been carried out in my division since the transfer are the following : From Uxbridge to Oxford (the road line of the former), United Kingdom Company, 39 miles has been entirely rebuilt and reinsulated, and two additional wires have been run from Oxford to Birmingham, 64 miles, the whole of the line has been so far repaired as to be almost equivalent to rebuilding ; it has been fully reinsulated, and one additional wire has been run. Between Oxford and Gloucester, 46 miles, the line did not need entire repoling, but many new poles, equal to an average of six or seven per mile, have had to be erected, and the whole of the wires have been fully reinsulated. From Towcester to Birmingham, the former magnetic main route, the whole of the poles have been renewed, reinsulation is in active progress, and five new wires are being erected upon the section. I may mention that the entire work on this length will be completed in all probability by the end of the present month. From Birmingham northwards, by Magnetic line to Manchester, we have erected new poles for a certain distance, say about 10 miles at each extremity. From Birmingham to a little beyond Walsall, and from Manchester to some distance south of Stockport. The work in this quarter has been suspended by the necessity for drawing men away from it for the urgent demands of the new Irish line. From Manchester to Liverpool, *viâ* Warrington, the former United Kingdom line, the poles have been more or less fully replaced as necessity might require, and the wires have been fully reinsulated. Between Manchester and Liverpool *viâ* Wigan a more complete change has been requisite. Between Manchester and Wigan it has been enough to repair the wires on the existing line and reinsulate them, but from Liverpool to Wigan we found it desirable to supersede wholly the former existing line on the canal and replace it by a new independent line erected on the high road. This work of replacing is in progress, and will be completed early in the next month. From Birkenhead round by Runcorn to Liverpool a new main line is in course of erection ; over a certain section of it three new wires, and over another section eight have been fully erected, that is from Birkenhead to near Runcorn. Between Runcorn and Liverpool the works are in active progress, and by the 10th of January at latest, at least six wires will be completed throughout on this section. From Sutton, a point a few miles from Birkenhead on the road to Runcorn, a new line has been run to Neston, a village on the road between Hoylake and Queen's Ferry. On this new line five wires have been erected, and they are extended at Neston upon the poles formerly belonging to the Mersey Dock and Harbour Board, which have recently been acquired by the department. These five wires are carried to Queen's Ferry, and from Queen's Ferry outwards to Bangor. The very heavy work of entirely reconstructing the Mersey Dock Board's line, and erecting upon it eight new wires, is in progress. This work is being carried on at high pressure, and with many different gangs scattered over the length. In brief, I may say that I contemplate its entire completion by the termination of the present month, or within a few days after it. From Bangor onwards to a place known as Porth Crugmore, on the western coast of Anglesea, an entirely new line, varying from seven to nine wires, is being run. This line is intended to connect with the new English and Irish cable. The poles will certainly be up, and the greater part of the wires, by the same time as those between Queen's Ferry and Bangor, that is, at the end of the present or early in the ensuing month. Between Manchester and Ashton, on the former United Kingdom canal line, we entirely reinsulated the whole of the 11 wires. Little has been done to the timber, and not much will need to be done for the next year or two. From Ashton to Macclesfield a similar process of reinsulation is in progress, and is almost completed, with very good effect. From Macclesfield to Wolverhampton similar operations are in hand, reinsulation but not renewal of timber. From Wolverhampton upwards to Birmingham I found it necessary to reinsulate the whole of the wires almost immediately upon my taking charge of the division, which I now have the honour to manage. But this was a temporary measure. It was something to make it possible for us to work at all, it was not enough ; the timber now needs to be replaced, in addition to the reinsulation formerly needed. Between Birmingham and Gloucester *viâ* Droitwich and Worcester the former Magnetic line has been put into a state of partial repair ; that is to say, the necessities of the current year have been met, but next year we must do more ; we have renewed certain very bad places and reinsulated other sections, but have not yet done all that is needful. From Gloucester to Swansea, in South Wales, there are two road lines of telegraph existing, one the former property of the Magnetic Company, the other of the United Kingdom. For considerable lengths of road these two lines run parallel to each other, one on either side of the way, and where circumstances admitted I have consolidated them into one telegraph, bringing them into one set of poles. This work of consolidation has been realized for somewhat over 20 miles, and about 20 miles more of the separate line has been put in fairly good order. I anticipate that by the end of February next the whole of the works in this region will be completed. The only important section of road or canal line to which I have not adverted is that between Wolverhampton and Chester, the former property of the United Kingdom. At this moment it is in the worst condition of any road or canal line that I have to do with, and it is so far important that three or four London and Manchester wires pass over it ; but I must let that remain as it is till the Irish wires are done. I assume, however, that I shall have no difficulty whatever in entirely reconstructing and reinsulating this section of the line by, at the farthest, April next. I may now mention what important changes and improvements have been made with reference to the underground work in the larger towns. To commence near London : In High Wycomb 13 wires carried on the roofs of the houses which had been a source of intermittent trouble for several previous years, and which were at

the time of my being first acquainted with them in a very bad condition, have been replaced by an underground line buried in the streets of the town. In Banbury a similar change has been made, to the great benefit of all circuits passing through it. In Birmingham two sets of open work carried over the houses, formerly belonging to the United Kingdom Company, have in the same way been replaced by covered work, and a long length of previously existing buried wires belonging to the Magnetic Company which had become untrustworthy have been replaced by new wires. In Macclesfield two and a half miles of street work, the former property of the Magnetic Company, have been renewed and replaced. In Congleton about 1,000 yards of underground wire has been taken up and replaced by open wires. In Manchester a similar change has been effected, somewhat over a mile of underground being thus replaced. At Tewkesbury 1,300 yards of covered work have been similarly superseded, and at Droitwich about 800. In Liverpool the construction of nearly four miles of new underground work, having in some portion of it as many as 57 wires, is now in active progress, and when completed, which it will be within a month at farthest from the present date, we shall be able to abandon a considerable length of independent over-house systems. In Chester an important section of underground work, over a mile, is in hand, and in January we shall undertake a similar important work at Shrewsbury. Between Oxford and Chester, on the Great Western Railway, an average of 13 wires is being erected on new poles throughout, and from Chester to Queen's Ferry a short extension by the riverside is being erected to connect these new wires to the Dublin and Liverpool lines. In addition to these special works, involving great outlay, and the employment of a large force, but of paramount necessity (because, had they not been undertaken, it is certainly humanly impossible that the communications of the Department could have been kept up during the present winter), many considerable improvements of local communication have been effected, and I may particularly instance the benefits derived from the erection of new wires between Hereford, Shrewsbury, Worcester, Oswestry, and various places in North and Central Wales. In fact, local improvements of this kind have been so numerous that I cannot at all adequately detail them from memory. As regards extensions to offices not previously reached by telegraphic communication, I am scarcely prepared to give accurate details, but I am within bounds when I say that since the 29th of January last upwards of 180 new post offices have been opened for telegraph purposes within the limits of the north-western division. As regards the future, with reference to extensions, I have only to say this, that if I am allowed to concentrate the greater portion (in fact, I should like to concentrate the whole) of my available working force upon the improvement of existing trunk lines, and upon the erection of those important trunk wires that are urgently called for, I should pretty nearly suspend extension operations until perhaps April or May next. But if that can be allowed, I have then to say that between May next and the December following I could complete at least two-thirds, if no more, of the whole of the extensions that it is contemplated should be made by the Department; or indeed, if it be needed, I could almost pledge myself to complete every extension of every sort or kind by the 31st of March 1872."

Mr. Shaw, formerly of the United Kingdom Company, and now engineer of the Department in the north-east of England, said :—

"In the north-eastern division the principal works that I have had to undertake since the transfer consist of a total re-insulation of 2,820 miles of wire, and the total reconstruction of about 255 miles of lines on roads; the re-insulation covers about 560 miles of then existing road lines. The new works that I have undertaken and have completed consist of about 230 miles of new wires on roads and extensions, 173½ miles of new wires on existing poles on roads and extensions, 248½ miles on existing poles on railways, and 20 miles of new wires on new poles on railways. The new wires on railways in my division are very small indeed, on account of my division being nearly all road work. Since the transfer there have been about 137 new offices opened or completed in the north-eastern division. The underground works in the towns of Hull and Nottingham have been totally renewed. The underground work in Sheffield has been thoroughly repaired, and the underground work in Leeds, Norwich, Yarmouth, and Cambridge has been repaired, although in the latter town I think the Department will have to totally renew it. The works that I have now to complete run pretty much as follows: a new road line between Hull and Doncaster. This will be completed by about the middle or end of June. I should say before. I commence to speak about completing works that the five wires, from London to Towcester, of the new Irish work, will be completed about the 13th or 14th of this month, that is, next week. The new wires to Scotland by the Magnetic road line to Doncaster will be completed by the end of April. The new wires to Hull will be completed in about the same time. I have also to build a new road line from Doncaster to Hull, which will be completed about the end of June. A new line from Leeds to Hull; the new wires will be completed about the same time. The only portion of the north-eastern district not completed by June will be the renewal of the United Kingdom line from London to Blisworth, which will require renewal as regards poles and arms and insulation, in fact total reconstruction. From Blisworth to Leeds the United Kingdom Company put in about 12 poles per mile, from two to three years ago, consequently the Department will not have to totally renew that line, but to put in seven or eight poles per mile per annum for the next three or four years. From Barnsley to Staley-bridge the late Magnetic Telegraph Company's line will be totally rebuilt by the end of June. This will complete the larger works in the north-eastern division."

Mr. Walsh, formerly of the Magnetic Company, and now engineer in the north of England, said :—

"Immediately after the transfer I was called upon to carry out some very extensive renewals. The first I may refer to was the road line from Preston to Carlisle, late the Magnetic Company's line, that line being 90 miles in length, and I have absolutely re-poled it, re-armed it, and re-insulated it from end to end; besides which I had some trouble in carrying the wires in a better manner across the Shap Fells. The Magnetic Company and Lord Lonsdale had some legal proceedings with respect to the injury caused to his lordship's game by the telegraph wires on the Fells, and as a compromise it was arranged that a suspended cable, which should contain all the wires, was to be substituted for the

iron wires, and upon certain sections the iron wires were to be arranged all on one arm. If I had not had that arrangement modified it would practically stop us from putting any more wires up, because you very soon come to a limit where you have to put all the wires on one arm. However, I was able to arrange with Lord Lonsdale's agent, so that by meeting his views half-way—namely, by putting sections of the suspended cables under ground—he would allow me to arrange the wires in the ordinary way on poles for the other sections. The consequence is, that I am now able to put up additional wires which the Department already requires by that route. I am sorry to say, however, that we have not yet reaped the advantage of the good state of that road line, because when we come to Preston we then go on the railway, and the state of the wires as between Preston and Manchester and Preston and Liverpool is very bad indeed. However, the engineer-in-chief has taken that up with the railway company, and he is endeavouring to hasten their repairs. The next heavy work of renewal I had to undertake was the late United Kingdom Company's road line from Leeds to Jedburgh, that is a line of 156 miles. That line, in the first instance, I re-insulated, and I have since re-poled it in certain places, and now it is as good a line as any we have going north. I have also had to deal with the United Kingdom Company's road line from Manchester to Leeds, 48 miles, and I have, up to the present time, completely re-poled about half of that. I have also laid down about 500 yards of covered work at Preston for the purpose of looping the through wires into the post office of that town, and I am now engaged doing the same thing at Wigan, through which the main lines of the late three telegraph companies pass. I have still to complete the renewal of 110 miles of line and 749 miles of wires, and I have orders to erect four additional wires by the east coast road, and eight additional wires by the west coast, equal to 1,404 miles of wire. I have a new line to erect from Wigan to Manchester, the section of which between Wigan and Preston is virtually completed; and I have also to erect a new line from Wetherby to Peckfield. I think I can undertake to say that with respect to the renewal of works that still remain to be completed, and also with respect to the additional wires, I shall have completed all by about the 1st of May. Mr. James has called my attention to the Isle of Man. In the Isle of Man I have also a line to renew from Douglas to Ramsey; but that also I shall have completed by the 1st of May next, and if the Department would be good enough to defer all the extensions to sub-offices, at all events as far as possible, I should be prepared early in May next with a very strong force to carry out such extensions rapidly."

Mr. Tansley, formerly of the Magnetic Company, and now engineer of the Department in Scotland, said :—

" Since the transfer a few short extensions have been completed from time to time as occasion has required, but our attention has been chiefly directed to the repairing and strengthening of the lines. The main line from Jedburgh to Glasgow, about 100 miles, has been partially re-poled and strengthened in other ways. The road line from Girvan to Port Patrick, a distance of about 43 miles, has also been partially re-poled, that is, poles have been put in where necessary. The electric line from Dumfries to Port Patrick is now in hand, being strengthened with a number of poles, and the work will be completed probably during the month of January. The line from Portsoy to Garmouth, a distance of 20 miles, has also been overhauled; some new poles have been used, with new insulation. We have re-insulated about 290 miles of line, carrying about 960 miles of wire; these, of course, are the main lines to England and Ireland. Of new wires we have to erect four from Edinburgh to Perth, partly on existing and partly on new poles. This work is in hand, and will be finished, I think, probably by the end of February, or at least during March next. From Glasgow to Port Patrick we have three wires to erect. This work is also in hand, and will be finished about the same time. Of course, various small improvements have been made in different localities which I cannot well detail just now, as I have not got particulars with me. I think that all the new work, and the repairs which are necessary, as far as my division is concerned, will be completed by the end of March 1871."

Mr. Eaton, who has charge of the line arrangements at the central stations and of the underground street wires, said :—

" The increased requirements for provincial lines, and also the extra metropolitan stations that come within the localities through which the trunk lines of the Electric Company's underground system passed, necessitated a complete renewal, in order to provide the extra number of wires necessary to be drawn in the underground pipes. Within the last twelve months, dating from some six weeks prior to the transfer, the routes that have been treated in this way, that is, by drawing out the old wires and drawing in new, with the extra number added, have been the following: From Telegraph Street to Paddington *via* Gresham Street, Holborn, and Oxford Street. From Telegraph Street to Westminster *via* Fleet Street and the Strand. From Telegraph Street to the Borough, Union Street, *via* London Bridge. From Telegraph Street to the Angel at Islington *via* the City Road. From Finsbury Square to Shoreditch. From the Strand to Waterloo Railway Station. The quantity of wire drawn into the several pipes enumerated above is in all 539 miles, from which, of course, must be deducted the length of wire drawn out, which may be roughly stated at 300 miles, the difference being the increased lines required by the Department. In addition to the lines that already existed, and through which an increased number of wires were placed, the following new work was undertaken: For the concentration of the various companies into Telegraph Street it was necessary to lay a mile and a half of new pipes, into which was drawn $99\frac{1}{2}$ miles of gutta-percha wire; from the City Road to Shoreditch Church, 790 yards of pipe, and $6\frac{3}{4}$ miles of wire; from Shoreditch to the Kingsland Road, or to Stoke Newington rather, $2\frac{1}{4}$ miles of pipes, and 63 of wire; from Paddington to Harrow Road, $1\frac{3}{4}$ miles of pipe, and 42 of wire; from the Angel at Islington to Highgate, $4\frac{1}{4}$ miles of pipe, and 63 of wire; from Buckingham Gate to Clapham Common, $2\frac{1}{2}$ miles of pipe, and 56 of wire; from Telegraph Street to the Mansion House, and from Telegraph Street to Threadneedle Street, new works were

necessary, with a length of pipes laid equal to half a mile, and a length of wire of 43 miles; from Union Street, Borough, to New Cross, $3\frac{3}{4}$ miles of pipe, and $112\frac{1}{2}$ of wire; making a total of new work absolutely laid in the London streets of $16\frac{3}{4}$ miles of pipe, into which were drawn $487\frac{3}{4}$ miles of wire. The total increase of mileage in underground wire in London is 740 miles of gutta-percha covered wire. With regard to the central station, of course the increased number of stations in the metropolitan district necessitated an increased number of instruments to be fixed at the central station. I am not prepared with all the details of that. The net increase of underground wires in London may be given in this way, that we have drawn in 539 miles of wire into old pipes, and we have withdrawn from the same pipes 300 miles, leaving a balance of 239 miles. Into new pipes we have drawn in 487 miles, making a total of extra wire of 487, plus 239."

Lastly Mr. Culley, the engineer-in-chief, made the following remarks with regard to the improved instruments and other appliances which the Department has introduced :—

"At the transfer we found that the road lines which came into the hands of the Department were almost in every instance exceedingly defective, and a large sum was deducted from the purchase money of those lines to meet the renewals which the Department knew would be necessary. At the time of the transfer these lines were so badly insulated, that whenever it rained communication was stopped, as we all know from the newspaper reports of the time. It was impossible that these lines could be re-insulated or otherwise improved immediately; but it was possible, by adopting certain electric methods known to us, to make the communication more certain and more rapid. The first thing, then, was to adopt on all important circuits these improved methods, especially the method of double currents. As quickly as apparatus could be procured, more perfect instruments were placed on all the most important circuits, and where lines were too long to be worked through from terminal station to terminal station, without repetition or without translation, by relay—we employed a better description of repeater. In order to increase the number of messages which could be sent through the wires in a given time, a very large use has been made of the Wheatstone automatic instruments. This system was in use by the Electric Company before the transfer. There were four circuits then—one to Glasgow, one to Edinburgh, one to Newcastle, and one to Manchester from London. Since the transfer two circuits have been supplied with this apparatus from London to Liverpool; one to Hull, one to York, one to Plymouth, one to Sheffield, one to Leeds, one to Dublin, one to Cork, one to Cardiff, and a second one to Edinburgh, one between Manchester and Glasgow, and one between Edinburgh and Aberdeen. One from London to Bradford, and one between Liverpool and Glasgow. In addition to these automatic circuits for ordinary business we have fitted up what we call the Western News Circuit for automatic work. This circuit runs from London to Bristol, Gloucester, Cardiff, Cardiff Post Office, Newport, Exeter, and Plymouth. The news is sent to all these places simultaneously, and at the rate of 50 to 55 words a minute. Special instruments adapted to the automatic system have been provided at the stations named; the Wheatstone automatic instrument itself being used at London only. We have also done a great deal in the way of pneumatic communication in towns. In London we have laid down two pipes between Telegraph Street and the General Post Office. These two pipes will, in the course of a week or two, be extended to Temple Bar. We have laid down two pipes from Telegraph Street to Threadneedle Street, one to the Baltic Coffee House, one to Lloyds, one to Gresham Street, and one to the British Indian Company's Office in Broad Street. We have also extended the system of pipes in Liverpool, in Manchester, and in Birmingham; and in Glasgow we have instituted a perfectly new system. We have erected new pumping engines for the pneumatic system in London, in Glasgow, and in Liverpool; and we have now in progress a pneumatic system for Dublin, with its engine; this will be completed about the end of January. With respect to the improvement of the line wires which I have mentioned as having been very imperfect at the time of the transfer, the work done has been already described by the divisional engineers. The result has been that atmospheric influences, as I think they used to be called, have almost entirely ceased to act upon our more important wires, although I must confess that some few still remain inefficient, it having been impossible to repair them all. Had not the public put so severe a pressure upon the Department for extension to new places, such a pressure as it was impossible to resist, I think I might have been able to have secured more efficient work and a better service. It is, perhaps, right that I should mention that we have effected a very great improvement at a considerable expense to the Department in the single needle instrument. Prior to the transfer, with but few exceptions, these instruments were capable of being stopped by thunderstorms from the demagnetization of the needle. The Department has adopted a new form of single needle, which is not subject to this very serious drawback. The Department has had a very large number of inventions brought before it, and it might have been hoped that very considerable advantage to the public might have arisen from the breaking up of the monopoly of the companies and the private interests which almost all the officers had in perpetuating the form of some old instrument. But I am sorry to have to report that not in any one instance has any apparatus or system of signalling been laid before me of practical value. One system only has been of such a nature as could possibly have any value, and that would require fully 10 years to mature before it could be brought out. I think it is right to say this much, because it was supposed that a number of useful inventions had been kept back because of the indisposition of the companies to use them."

It will be necessary for me hereafter when I come to describe the mode in which the Department has carried out the various branches of its undertaking, to touch a little more fully upon some of the topics referred to by Mr. Culley and the divisional engineers, and especially to make some further remarks upon the working of the Wheatstone automatic instruments, and upon the pneumatic tubes. I shall also have

to call attention to an important service rendered to the Department by Mr. Winter, the assistant engineer-in-chief, who has devised such a re-arrangement of the wires which the companies had carried by different routes between London and the principal towns, as, without taking away any accommodation from those towns, leaves about 1,400 miles of wire for the formation of fresh circuits.

MESSAGE TRAFFIC.

Great as have been the exertions of the Department, nothing less would have sufficed to enable it to keep pace with the growth of its business. In the first week after the transfer the number of messages (exclusive of news messages, of which I will treat hereafter,) forwarded from all stations was 128,872; in the week ending 31st March the number had risen to 160,775. The average weekly number in 13 weeks to 30th June was 177,410; the average number in 13 weeks to 30th September was 200,787, and the average number in 13 weeks to 31st December 1870 was 203,572. In the week ending on the 31st December, which is usually considered the worst week in the year for telegraphic work, the number was 144,041, or nearly 16,000 messages in excess of the number with which we started.

The total numbers of messages forwarded in the three quarters to 31st December 1870, were as follows :

In quarter to 30th June	-	-	-	2,306,340
In quarter to 30th September	-	-	-	2,610,237
In quarter to 31st December	-	-	-	2,646,438
				<hr/>
In the nine months	-	-	-	<u>7,563,015</u>

I believe that the number for the current quarter will exceed that of the past quarter. The heaviest week in the nine months was the week ending 23rd July, when the war panic raised the number to 234,194. The lightest was the week ending 31st December, when the Christmas holidays brought the number down by 35,000 below that of the previous week.

Although the railway stations at which telegraph business is conducted on behalf of the Postmaster-General are nearly as numerous as the postal telegraph stations proper; there being about 1,820 of the former to 1,960 of the latter, these last are so much more convenient in all respects to the public that 91 per cent. of the whole number of messages are forwarded from them, and only 9 per cent. from the railway stations. This circumstance alone shows that the separation of the commercial from the railway system, and the transfer of the telegraph offices from the railway stations to the post offices, was a measure really required for public convenience.

PRESS AND NEWS WORK.

The numbers of messages given in the last section do not include press and news messages. In an earlier portion of this report I have shown what it was that the proprietors of newspapers desired and expected to obtain from the transfer. I have shown that they desired to have freedom of collection of news with low rates for its transmission, no matter for what or how many agencies it was transmitted, and I quoted the clause which was introduced into the Act of 1868 to give effect to their wishes.

There are now under the operation of this clause two principal associations for the collection and supply of news, to wit, the Press Association and the Central Press; and the Post Office must transmit the news collected by these associations, or by any others which may hereafter be formed, on equal terms. The collection of news is open to all, and equal facilities for its transmission are secured to all who collect it.

The anticipated results have followed. The companies sent news to 144 towns only in the United Kingdom; the Post Office, acting on behalf of the before-named associations, sends it to 365 towns. The following statement gives the number of towns to which the news was and the number to which it is sent direct, and also the number of towns to which it was and is sent by one, two, or more re-transmissions.

How sent.				Number of Towns to which the Companies sent News.	Number of Towns to which the Post Office sends News.
Direct	-	-	-	28	66
With one re-transmission	-	-	-	81	224
With two re-transmissions	-	-	-	28	54
With three re-transmissions	-	-	-	7	16
With four re-transmissions	-	-	-	—	5
Total	-	-	-	144	365

In the 144 towns to which the companies sent news there were 306 subscribers for news. In the 365 towns to which the Post Office sends news there are 1,106 subscribers for news. The companies sent news to 173 newspapers only. The Post Office sends it to 467 newspapers. Thus there is an increase of 221 in the number of towns to which news is sent, an increase of 800 in the total number of subscribers for news, and an increase of 294 in the number of newspapers taking news. There is, moreover, a vast increase in the quantity of news transmitted. The companies sent during the session of Parliament nearly 6,000 words of news daily; during the remainder of the year they sent nearly 4,000 words daily. The Post Office sends during the session of Parliament, on behalf of the before-named associations, nearly 20,000 words of news daily; and during the remainder of the year it sends, on their behalf, nearly 15,000 words daily.

Again, news was and is collected for newspapers by their ordinary correspondents in town and country. The companies charged the newspapers half rates for the transmission of news from their correspondents, but only those papers who were subscribers for the news collected and supplied by the intelligence department of the companies, all other papers were charged full rates; the Post Office charges the much lower rates fixed by the Act of 1868. The quantity of news formerly transmitted by ordinary newspaper correspondents is not known, but at present they hand in from 15,000 to 20,000 words daily for transmission. Formerly the companies supplied the London newspaper proprietors with passes, which enabled their correspondents to send their messages without prepayment, the charges being reclaimed in a monthly account. The companies would not extend this accommodation to the provincial press, but the Post Office has extended it to the provincial press, and it is now enjoyed by the correspondents of 64 newspapers and seven news associations.

Seven newspaper proprietors rented special wires during the night, of the companies, and the same number of wires are rented by them from the Post Office. They have all gained in this respect, that whereas they paid the companies a rate ranging, according to distance, from 750*l.* to 1,000*l.* per annum, they pay the Post Office an uniform rate of 500*l.* per annum. Two other newspaper proprietors are about to take special wires, and many more could have been let if the Department could have spared them. There can be no doubt that it will obtain a largely increased rental from this source so soon as its additional wires have been erected. During the past year the pressure of commercial business has too often compelled us to take away a special wire for one or more nights, or for a part of a night, from the newspaper to which, subject to such a condition, the same had been leased. This of course has given rise to dissatisfaction. On the other hand, the special wires have been led into the offices (at both ends of the line) of the newspapers hiring them, so that while they are in use the greatest possible amount of work may be got out of them.

On the first Tuesday in September there were sent over the special wires of the Edinburgh Daily Review - - - - 7,823 words.
 „ „ Courant - - - - 9,582 „
 „ „ Scotsman - - - - 8,300 „
 „ Glasgow Herald - - - - 11,043 „
 „ „ Daily Mail - - - - 5,213 „
 „ Dublin Irish Times - - - - 9,377 „

Each of these newspapers at the same time had news from the news associations, and from its ordinary correspondents.

A very large portion of every leading provincial newspaper now consists of news received by telegraph. I have seen as many as twelve columns of telegraphic news in leading provincial journals, and have read in Aberdeen, in a local paper, several columns of news which if Aberdeen had been dependent upon London papers for its news could not have been known there until six and thirty hours afterwards.

Latterly the Manchester Guardian, the Manchester Examiner, the Manchester Courier, and the Dublin Freeman's Journal, have employed London agents to send them very long morning expresses for their second editions. The Belfast Northern Whigs also send every evening a long express for its early edition.

There is no reason to doubt that the news associations give satisfaction to their customers, who would hardly increase, as they do increase, from day to day, if they were dissatisfied with the supplies sent to them. It is believed that they are now tolerably well satisfied with the manner in which the Post Office performs its share of the work. It is not pretended that they never complain, for of all the advantages which they expected to gain from the Bill of 1868, that which Mr. Frank Finlay so much desired, the advantage of being able to complain without fear of the consequences, is the one of which they have most freely availed themselves; but their complaints are less numerous and less bitter, and there seems good reason to hope that from day to day their relations with the Department will become more and more satisfactory.

I shall have occasion hereafter, when I come to describe the mode in which the Department has accomplished the various branches of its undertaking, to call attention to the singular ability and energy which Mr. Patey has displayed in organising and arranging the news service, and I shall also have to note the completeness and efficiency of the arrangements which Mr. Chetwynd has made for checking and bringing to account the produce of the news messages, which forms a very important item of the revenue.

RACE MEETINGS.

The telegraphic business done at and in connexion with race meetings is large and lucrative, but troublesome. Special arrangements have to be made for every meeting; the work has to be done under great pressure; and the senders of the messages are more irritable, and, when they are irritated, more free in the use of their tongues than any other class of the community. On the whole we have contrived to give them satisfaction, and this result has mainly been brought about by the ability and zeal of those who have superintended the arrangements at the great meetings of the past year.

Mr. Preece and Mr. Kerswell have been mainly instrumental in this respect on the south of the Thames, and Mr. R. W. Johnstone has rendered very important service on the north.

I take the following passages, and the accompanying return, from an interesting report which he has made to me on the subject.

"I beg to forward, in accordance with your instructions, the accompanying return of racing work performed by the Department from the date of the transfer to the present time, which includes, to the best of my knowledge, every race meeting of the year, except that at Shrewsbury now in progress, and that at Warwick a week hence.

"As a matter of course Newmarket heads the return, showing, as it does, a number of messages equal to nearly one third of the total number for the whole country; and I hope, therefore, it may not prove altogether uninteresting if I detail one or two circumstances connected with the disposal of this large amount of work. At the earlier meetings of the year I had a return kept of the average delay on forwarded messages, from which it was proved that we did the work in something like half the time taken by the companies, notwithstanding the immense increase of business (nearly double) and without any corresponding increase of facilities. Indeed, it was rather the other way, for while we had precisely the same circuits as those worked by the companies, the business was done at one (town) office as compared with two under the old system.

"The outside delay on *any* message was under half an hour, which simply represented the time occupied in transmitting the long press messages, while the great majority of ordinary messages was got off in *five minutes and under*.

"As Newmarket shows the heaviest business in the aggregate, so it furnishes the largest result from any single meeting, viz., the "Cambridgeshire" week, when upwards of 8,000 messages were disposed of. In the 15 days of the October meetings there were, in round numbers, 20,000 messages forwarded and received; and of these, upwards of 2,000 were long press messages containing 120,000 words. Large as are these figures, they become still larger when it is borne in mind that the bulk of this work was performed on the mornings of the race days between 10 a.m. and 1 p.m., and in the evenings after

8 p.m. During the "Cæsarewitch" week, for instance, on Tuesday, the "Cæsarewitch" day, nearly 1,000 messages were taken in and disposed of at the town office, between 10 a.m. and 1 p.m.; on Wednesday, 800 between 10 a.m. and 12 noon; and on Thursday, 750 between 10 a.m. and 12.30 p.m. Of upwards of 3,500 received messages for the 15 days only about 30 remained undelivered at the close of the meetings, which, considering the difficulty of "localizing" betting men, and the great drawback which has always been experienced on this account is, I consider, a wonderful result. This bears with great force on the proposition I have submitted to Mr. Scudamore for a permanent "ring messenger" to travel with the staff, and attend all important race meetings.

"It is gratifying to be able to add that the whole of this immense traffic was disposed of without, so far as I am aware, a single serious complaint, either from the press or the public; and it will be observed from the return that the estimated profit on the year's work, *i.e.*, on 29 days' racing, was over 1,200%.

"Newmarket being the "head-quarters" of racing, and affording, as has been shown, a large yearly revenue, the companies naturally turned their attention to the arrangements for providing for the work there more than at other places; and as a result of this, the accommodation which fell to the lot of the Department at the transfer was better suited to the purpose than in many cases of racing towns. Still, it was not all that could be desired, and early in the year I proposed some trifling alterations both at the town and course offices, which have proved of considerable advantage in the despatch of the work.

"I have submitted a plan for improving, at a very trifling cost, the accommodation at the racecourse, which has met with the surveyor's approval, and having received your sanction, will be carried out in time for the commencement of business next year.

"Passing from Newmarket, I come to Doncaster, where, in spite of defective accommodation at the post office, and the difficulty of obtaining the requisite number of circuits, a very substantial success was achieved for the Department; the manner in which the work was done having secured special notice in all the papers interested in sporting matters.

"The old office of the Electric Company, now let as a shop, was occupied for the "Leger" week as a branch counter; and, being close to the subscription rooms, was found to be of great public utility. A portion of the sorting office was fitted up, temporarily, as an instrument room; and although there were many difficulties and much discomfort in carrying on the duties, the public certainly did not suffer by the arrangement.

"The offices at the Grand Stand, hitherto occupied by the several companies, were converted into one office, in accordance with plans submitted by me to the borough surveyor; and now we have at Doncaster one of the finest, if not the very finest, racecourse offices in the kingdom.

"Just after the St. Leger Meeting, I submitted a plan for providing a new instrument room at the post office, and the matter being at present in the surveyor's hands it is probable that all difficulties will be disposed of before another year. It only remains to advert to the noticeable feature that the Doncaster Meeting produced the largest number of messages on any single day, *viz.*, the "St. Leger" day, when no fewer than 1,999 messages were disposed of, nearly 500 of which were taken in at the Grand Stand, and cleared off within an hour and a half.

"The figures in the return relating to Epsom will probably excite some little surprise from the comparative smallness of the number of messages disposed of at the meetings held there. But it is to be borne in mind that the spring meeting is a comparatively trifling affair; while the great "Derby" gathering is more a pleasure than a "business" occasion. Moreover, the great mass of press work usually telegraphed from the more distant meetings is, in the case of Epsom, carried to town by hand, and thus an important item falls to be omitted from an otherwise very satisfactory return.

"In connexion with the summer meeting a new office was provided at the grand stand, and an extra circuit was worked over and above those usually employed by the companies on racing occasions.

"An interesting paper, compiled by Mr. Preece, showing the nature of the arrangements made for this meeting, forms an appendix to this report, and the 'Daily News' thus notices the provision made for the work at the grand stand:—

"The curious in such matters should note the improvement in the telegraphic arrangements of the grand stand since they have been transferred to the Post Office. The Post Office arrangements are the chief novelty of the year."

"The arrangements at Doncaster and Newmarket elicited similar expressions of satisfaction from the 'Standard' and the sporting press generally.

"To measure the advantages gained by the racing public since the transfer, by merely taking the cases in which the Department has extended wires to a racecourse, or has either opened a new office, or improved an existing one, at the Grand Stand, would be to scarcely do justice to the Department in this matter. In many cases, as for instance, at Huntingdon, Stamford, Lewes, Chelmsford, Salisbury, and other towns having race meetings, the telegraph was only at the railway stations prior to the transfer, so that the public have reaped a very considerable advantage by the mere removal to the Post Office. Nor only so, but they have gained immensely by the abolition of Grand Stand fees, and the introduction of the system of 3d. copies; not to speak of the much extended hours during which the offices have been kept open at the different places, and the saving of gratuities on late messages. I calculate that at Newmarket alone during the past year the saving to the public under these heads is not less than 300%, which has been more than made up to the Department by the greatly increased traffic of the season. And while there have been so many advantages to the public, there has been gain to the service in the greater simplicity which has been introduced into the system, and the consequently greater ease with which the work is performed. The giving of receipts was always a great bugbear at race meetings, and hindered the work, at the very point where despatch was most required, frightfully. So superior is the new system of 'stamping' the message that the 1,000 messages to which I refer in the early part of this Report as having been disposed of at Newmarket within three hours, were all taken in by two counter clerks, without even the semblance of the 'rush' which used to characterise the proceedings of the old

days. The abolition of the 'messenger's ticket' is also an immense gain in the delivery of messages, while the system of accounts has been so simplified that little trouble is experienced in keeping the 'abstracts' up to the latest message, a thing not to be dreamt of under the old system. A special form which I devised for press messages at race meetings has received your approval as an experiment, and was introduced with (according to Mr. Ashley, of the Press Association,) much acceptance to press correspondents generally at the late Newmarket meeting. It is now on trial at Liverpool and Shrewsbury, and before another year's racing commences we shall probably be able to decide as to its permanent adoption for this kind of work. It only remains to add, that the experience and data which the Department has been enabled to collect during the past year will be most valuable in coming years; and there cannot be a doubt that the increase of telegraph work at race meetings will be in proportion to the increase of facilities for many years to come."

RETURN showing the amount of Telegraphic Business transacted at the Race Meetings of the United Kingdom, from the 5th of February to the close of the Season of 1870.

Town or District.	No. of Meetings.	Total No. of Messages.	Total Value.	Estimated Expenses.	Estimated Profit.	No. of Press Messages [Included in Col. 3].
1.	2.	3.	4.	5.	6.	7.
			£ s. d.	£ s. d.	£ s. d.	
NEWMARKET - - -	6	33,667	1,558 8 11	311 10 10	1,246 18 1	3,499
DONCASTER - - -	2	8,293	394 6 10	85 0 0	309 6 10	616
WARWICK - - -	3	6,637	317 18 1	56 7 3	261 10 10	707
EPSOM - - -	2	5,890	303 2 6	155 0 0	148 2 6	*230
YORK - - -	2	5,088	249 17 5	40 0 0	209 17 5	503
CHESTER - - -	1	5,015	247 5 4	50 0 0	197 5 4	389
LIVERPOOL - - -	3	3,848	203 6 9	55 0 0	148 6 9	213
ASCOT - - -	1	3,800	191 0 10	80 0 0	111 0 10	*100
SHREWSBURY - - -	1	3,737	164 8 2	55 0 0	109 8 2	303
GOODWOOD - - -	1	2,997	155 10 4	80 0 0	75 10 4	365
BRIGHTON - - -	1	2,583	133 15 9	20 0 0	113 15 9	256
NOTTINGHAM - - -	2	2,181	108 1 0	11 3 4	96 17 8	266
WINDSOR - - -	3	2,111	103 0 7	16 6 0	86 14 7	214
NEWCASTLE - - -	1	1,574	83 3 9	13 0 0	70 3 9	160
BATH - - -	1	1,565	83 16 10	50 8 9	33 8 1	121
STOCKTON - - -	1	1,476	68 13 1	11 15 6	56 17 7	157
LINCOLN - - -	2	1,463	80 19 7	12 10 0	68 9 7	204
HUNTINGDON - - -	1	1,445	67 5 2	5 0 0	62 5 2	129
WORCESTER - - -	2	1,382	76 0 9	8 6 2	67 14 7	283
STOCKBRIDGE - - -	1	1,328	59 18 0	20 0 0	39 18 0	*150
MANCHESTER - - -	2	639	33 3 1	12 14 9	20 8 4	100
South-eastern District -	11	2,219	119 9 5	19 18 10	99 10 7	253
South Midland District -	5	2,010	92 7 9	7 7 10	84 19 11	501
North Midland District -	5	1,877	103 2 11	27 11 6	75 11 5	366
South-western District -	8	1,757	86 11 11	17 6 10	69 5 1	548
North-western District -	4	1,503	69 8 4	8 16 9	60 11 7	176
Northern District - -	5	1,496	83 13 8	7 10 4	76 3 4	368
South Wales District -	4	1,470	75 3 7	7 6 2	67 17 5	433
North Wales District -	2	795	38 10 8	5 0 0	33 10 8	218
Eastern District - -	3	321	18 10 6	6 17 10	11 12 8	31
Western District - -	1	99	4 14 11	—	4 14 11	82
SCOTLAND - - -	5	2,004	92 11 1	10 16 8	81 14 5	603
IRELAND - - -	3	209	11 9 8	5 6 3	6 3 5	40
Small Meetings in various Districts not returned -	40	2,000	100 0 0	10 0 0	90 0 0	200
TOTAL - - -	135	114,479	5,578 17 2	1,283 1 7	4,295 15 7	12,784

a. Col. 4. The "Total value" is the amount actually received in cash, plus the value of "Received" and "Press" Messages, reckoned at 1s. each.

b. Col. 5. The "estimated expenses" are the travelling charges and per diem allowances of clerks specially employed on the occasion, the cost of superintendence, and of special messenger force, with, in some instances, a liberal allowance for incidental and other expenses not readily got at. The engineering expenses, however, have not been got at in many cases.

c. Col. 6. From the total amount of "estimated profit" there will fall to be deducted the sum of 300*l.* or thereabouts for the rent of accommodation at Grand Stands and Race Courses, not included under the head of "estimated expenses."

* These numbers not having been furnished in the returns sent in, have been estimated.

PRIVATE WIRES.

The original scheme of the Post Office did not contemplate any interference with the companies which had been established for the purpose of setting up and maintaining private telegraphic communication between the offices and wharves or warehouses or factories of commercial firms. When, however, the bill of 1868 was before the parliamentary committee, the chief of these companies, the Universal Private Telegraph Company, contended that their business would be destroyed by the introduction of a low and uniform rate for messages, and succeeded in establishing their claim to have their undertaking purchased by the Government. It was subsequently decided that the undertaking of the Economic Company, a company carrying on a similar business, should also be purchased.

We found it impossible to assume the management of the private wires at the date of the general transfer, and it was conducted by the private wire companies on behalf of the Department until the 1st July. Since that time Mr. Culley and Mr. Chambre, of the secretary's office, have been actively engaged in revising the scale of charges for private wires, ascertaining the precise extent and direction of those wires, and arriving at the number of wires in existing cables which are still spare and available for the use of future renters. Mr. Chambre has also been engaged in considering the best means of extending the private wire business, and has made some suggestions with that view to which I shall hereafter revert. The private wire business is for the most part confined to London, Birmingham, Bristol, Coventry, Derby, Newcastle, North Shields, South Shields, Sunderland, Manchester, Liverpool, Bradford, Glasgow, Dundee, and Dublin.

There are, however, many other towns in which private wires run from the postal telegraph stations to the residences or offices of men of business, who are thereby enabled to send their messages for distant parts to the postal telegraph stations by wire instead of by hand. Renters of these pay for the hire and maintenance of them, and also pay the ordinary tariff for the messages sent over them for re-transmission.

The private wire system comprises about 4,000 miles of wire, and produces a gross rental of 27,000*l.* per annum.

The following statement gives the scale of charges for rent and maintenance of such wires, and the regulations and conditions pertaining thereto.

TABLE of CHARGES for Rental of Private Wires (A.), Instruments, &c. (B.), Regulations and Conditions for Lines of Private Telegraph (C.), and Time Signals (D.)

A.				B.			
WIRE RENTAL SCALE.				INSTRUMENT RENTAL, &c., SCALE.			
	In London.	Other parts of the Kingdom.		A., B., C., per set of 1 Communicator 1 Indicator 1 Bell.	1 Single Needle and 1 Battery.	1 Printer and 1 Battery.	
	Per Mile per Annum.						
	£ s. d.	£ s. d.					
1. Over house or underground	8 0 0	7 0 0	1. If purchased from the Department	£ s. d. 25 0 0	Price. £ s. d. 7 10 0	£ s. d. 25 0 0	
2. On the roads - - -	6 0 0	5 0 0		Extra Bell { Ordinary, 5 <i>l.</i> each. Star or Indicator, 5 <i>l.</i> 5 <i>s.</i> each.			
3. Under water - - -	{ Special rates, according to circumstances.		2. For maintenance and repair of apparatus, the property of the renter - -	£ s. d. 1 1 0	Rental per Annum. * 2 10 0	* † 7 10 0	
⚙ Minimum charge in all cases to be for one Mile, beyond that distance, by quarter miles; any less distance to be counted as a quarter mile.				3. For hire, including maintenance and renewal -	£ s. d. 6 0 0	† 10 0 0	
				* Including renewal of battery. † Including supply of paper ribbon.			

C.—REGULATIONS AND CONDITIONS.

- (a.) *For an Instrument in a Postal Telegraph Office.*—For desk accommodation and clerks' services 5*l.* 5*s.* per annum.

Note.—When the private wire, intended to be in connexion with an instrument at a postal telegraph office, is not the property of the Department, the person desiring to have an instrument in the postal telegraph office is required to rent the instrument from the Department, and to pay the hire, maintenance, and repair rate.—Table B.No. 3.

- (b.) *Delivery of Local Messages.*—A charge of 3*d.* each is made upon messages sent over a private wire for delivery within the local free delivery; beyond that, the ordinary rates.
- (c.) *Extension of an Existing Line.*—If the extension does not increase the rental, the cost is to be borne by the renter.
- (d.) *Maintenance of Lines not the Property of the Department.*—Will be undertaken for any period of not less than one year; the annual charge is to be calculated at 1*l.* less per mile than the rates set forth above under "Wire Rental Scale;" but before the Department can undertake to maintain, the line must be put into thorough order by the proprietor. The Department cannot allow the erection on its poles of a wire not belonging to the Department.
- (e.) *Term of Contract.*—In ordinary cases, a private wire contract is to be determinable at three months' notice, or on payment of one quarter's rental; but in cases where the expense is considerable, a fixed term of from three to five years is to be made a condition. When the proposed line is in an outlying district, is specially provided for a single renter, and it is not probable that there will be other renters, a term of FIVE years is to be a condition of contract.
- (f.) *Payment of Rental.*—The rental to be in all cases payable yearly, in advance.

D.—TIME SIGNALS.

Charges for the use of wires and apparatus for transmitting:—

FROM LONDON TO THE COUNTRY.

1.—Ten o'Clock Current.

				Per annum.		
				£	s.	d.
To include rental and maintenance of a private wire from the Post Office to the renter's house of $\frac{1}{4}$ mile in length				12	0	0
Do.	do.	$\frac{1}{2}$	do.	-	14	0
Do.	do.	$\frac{3}{4}$	do.	-	16	0
Do.	do.	1	do.	-	17	0

2.—One o'Clock Current.

To include rental and maintenance of a private wire from the Post Office to the renter's house of $\frac{1}{4}$ mile in length				27	0	0
Do.	do.	$\frac{1}{2}$	do.	-	29	0
Do.	do.	$\frac{3}{4}$	do.	-	31	0
Do.	do.	1	do.	-	32	0

Note.—If the private wire section exceeds one mile the ordinary rates will be charged in addition to the 10*l.* or 25*l.* for the signal, as the case may be.

IN LONDON.

1. Use of time wire for the hourly current within a radius of two miles from the General Post Office } 15 0 0
2. For any distance over two miles the same rate, and in addition the private wire rate for the extra distance.

Note (a.)—Apparatus for receiving the signal must in all cases be found by the renter.

(b.)—Private wire regulations (c.), (d.), (e.), and (f.) will be applicable to time signal contracts.

The Department will undertake to supply the time current *only* where the existing postal arrangements will permit the work to be properly done.

November 1870.

5. I come now to describe the steps which the Department has taken in carrying out the various branches of its undertaking.

Steps taken between the passing of the General Act of 1868, and the Money Bill of 1869.

Although, as I have already stated, the Department could do nothing effectual towards the completion of its schemes until the Money Bill of 1869, which was required to give force to the Act of 1868, had been passed, it exerted itself strenuously to make such preliminary arrangements as were practicable under the circumstances.

The Telegraphs Act of 1868 received the Royal assent on the 31st July of that year, and the Department *immediately* took steps in fulfilment of the promises which it had made to the Parliamentary Committee to have the plant and the accounts of the various

telegraph companies, whose undertakings it was to buy, thoroughly overhauled and examined.

The examination of the land lines of the telegraph companies was entrusted mainly to Mr. Walker, the telegraph engineer of the South-eastern Railway Company; and in a minor degree to Mr. Bartholomew, a gentleman who had had much experience in the construction of land lines. It will be obvious that, as the plant to be examined was the entire telegraphic plant of the kingdom, the field within which the Department could hope to obtain independent examiners was necessarily extremely narrow.

The examination of the submarine property of the telegraph companies was entrusted to Messrs. Forde and Fleming Jenkyn, of whose fitness for this special work we possessed abundant evidence.

The examination of the accounts of the companies was entrusted to a committee composed of officers of the account branches of the Post Office, and placed under the superintendence of Mr. Chetwynd, the Receiver and Accountant General of the Department.

The instructions to and the reports from the examining engineers and Mr. Chetwynd's committee, had a very important bearing upon the price subsequently paid by the Government for the undertakings of the companies. They will be found in extenso in the papers printed prior to the transfer, and which accompany this Report, and will be alluded to hereafter when I have to state the cost and financial results of the whole undertaking. But it may be well that I should quote here some passages from the instructions, in order that the object which the Department had in view may be readily seen.

The Accounts Committee were instructed in the following general terms to ascertain the precise amount of net profits earned by the telegraph companies in the year to 30th June 1868:—

“On reference to the Act, and to the agreements confirmed by the Act, the committee will perceive that in the case of the Electric and International, British and Irish Magnetic, United Kingdom, Universal Private, and London and Provincial Telegraph Companies, it will be the first duty of the committee to ascertain, so far as they can from the accounts, what were the net profits of each company in the year ended 30th June 1868.

“On reference to the evidence taken by the Select Committee (Questions 2205 to 2214) it will be seen that the net profits were held by the promoters of the Bill to be the balance left of the gross receipts after allowing for the working expenses and for the maintenance and renewal of the plant. The telegraph companies did not dispute this construction of the term “net profits,” nor is it at all probable that they will now dispute it, and the committee must keep it steadily in view.

“In arriving at the amount of gross revenue and the amount of working expenses for the year, to the 30th June 1868, they must look, not to the amounts brought to account in that year, but to the amount of revenue actually earned, and the amount of expense actually incurred in the service of the year.

“For this purpose, a very strict analysis of the opening and closing balances of the year will be necessary.

“In considering the sums expended for maintenance and renewals, it will be well for them to ascertain the outlay in this respect in one or more years prior to the date at which the proposal for the transfer of the lines to the Government was broached. Taking one year with another, the cost of maintenance and renewals ought to be in one and the same proportion to the sum expended in construction. They should therefore ascertain the amount expended in construction up to, say, the middle of the years ended 30th June, 1865, 1866, and 1868, and then ascertain the sum expended in maintenance and renewals to the close of each of those years. If they, by this process, ascertain that the per-centage of the cost of maintenance and renewals to the cost of construction was the same in each of the three years, they will have a tolerably satisfactory proof that a proper sum has been expended on maintenance and renewals in the last of the three years. If, on the other hand, they find that the cost of maintenance was 8 per cent. of the cost of construction in 1865 and 1866, and only 6 per cent. of that cost in 1868, they will show that further and more precise inquiry into the condition of the plant is desirable.

“They will of course know that the Department contemplates an inspection of the plant in any case, but the extent and character of that inspection will in some measure depend upon the result of their inspection of the accounts. In arriving at the cost of construction, with a view to compare it with the cost of maintenance, they will of course strike off any preliminary expenses or sums paid for patents which may have been included by the companies in the cost of construction. They will also in the case of the Electric and International, and British and Irish Magnetic Companies, separate the cost of land lines from the cost of submarine cables, and show separately the cost of maintaining and renewing each kind of line.

“For a purpose hereafter to be noticed, it will be necessary for them to trace the history of the cables of these two companies back to their commencement, and to show the whole sums expended in laying them down, maintaining them, and replacing them up to the present time.”

They were also instructed how to deal with certain exceptions to the ordinary rule of purchase, upon which I need not now make any comment. To assist them in arriving at the true cost of maintenance, application was made to certain railway companies having an independent telegraphic system for such information as their experience enabled them to give.

The following passages are extracted from the instructions given to the proposed examiners of the submarine cables :—

“ By the terms of ‘ The Telegraph Act, 1868,’ it is provided that the price to be paid by the Postmaster-General for the undertakings of the Electric and International and Magnetic Telegraph Companies, shall be 20 years’ purchase of the net profits of those companies during the year ended the 30th June last. With Reuter’s Telegram Company the terms of purchase are somewhat different.

“ From the purchase money represented by a multiplication of the net profits, such amount is to be deducted as may be determined by arbitration to represent any greater relative risk attaching to the maintenance of the Norderney cable than to the maintenance of land lines of telegraph. There is also a further provision to be referred to hereafter.

“ In determining, as regards all three companies, what are the net profits, the question will necessarily arise whether a sufficient sum has been expended during the period above referred to in maintaining the cables in good working order ; and in conducting your inquiry, this point must be steadily kept in view.

“ The Duke of Montrose is aware that, owing to the peculiar nature of property which consists of submarine cables, some difficulty may arise in ascertaining the precise extent to which depreciation might have been preventible, but he nevertheless feels confident that the large experience which you have gained in the science of submarine telegraphy will suggest to you the means by which an accurate opinion may be arrived at.

“ You will no doubt think it well to commence your inspection by applying the usual tests to determine the electrical capacity and insulation of the conducting wires. A comparison of the result of these tests with any well-known and generally accepted standard, and with the tests which, no doubt, from time to time have been applied and recorded by the companies themselves (and in respect to which the companies, his Grace presumes, will be ready to furnish you with every necessary particular), will no doubt supply you with much valuable information.

“ This testing for conductivity, insulation, and so forth, his Grace takes it for granted will be made by yourselves in person.

“ But taking into account the object of this examination, it will be obvious to you that mere electrical tests, invaluable and indispensable though they are, will not of themselves alone be sufficient. You must be fully aware that cables in perfect working order have failed from imprudent exposure to violence and injuries due to other causes. His Grace understands that among the causes to which the failure of the first Atlantic cable, after perfect action for a time, might be attributed, one was that some fault in its formation had remained concealed to develop itself only after a time. Other cables have been repeatedly injured by ships’ anchors, and the mere step of underrunning or raising the cables to repair injuries so caused may of itself be sufficient to affect the durability of the cables.

“ These considerations, which would not be without weight in deciding whether a sufficient sum has been expended in maintaining the cables in a thoroughly efficient state, have still greater force as bearing on the question of the greater relative risk of maintaining hereafter the Norderney cable as compared with the land telegraph. They are also not irrelevant to the question of probable profits to be derived by Reuter’s Company under their contract with the Indo-European Telegraph Company, for which probable profits money compensation is to be made, inasmuch as it is evident that the risk attendant upon the company being able to maintain their cable must also involve a risk of the company getting no profit on their contract.

“ You will consequently take such steps as may appear to you expedient for collecting such data as will enable you to report on this subject.

“ It appears to his Grace that it is essential that data should be obtained, if possible, under the following heads, as regards each cable inspected :—

1. The length of the cable.
2. Its weight per mile.
3. Number of conducting wires.
4. Mode of protecting the core and insulating material.
5. Date of submergence.
6. Cause of failures (if any).
7. Periods during which the cable has been unserviceable.
8. Whether any difficulty is experienced in effecting repairs.
9. To what causes fractures, if any, of the cable attributable.
10. Whether any, and if so what portion, of the cable has required renewal, and at what dates.

“ In your report on the state of the lines, assuming you should be of opinion that an insufficient sum has been expended in the maintenance thereof, you will endeavour to form an estimate for the guidance of the arbitrator who may hereafter be called upon to assess the value of the property on behalf of the Post Office of the amount which should have been expended in keeping up the lines in a thorough state of repair and efficiency.

“ In the event of your being of opinion that the lines are otherwise than in a thorough state of repair and efficiency, you must take care that the estimate above adverted to is not a mere matter of conjecture, but one the accuracy of which you may reasonably expect to be able to maintain before an arbitrator, in the event of your being called upon to do so.

“ In the event of the companies habitually setting apart money for the repair of their cables, it may not be amiss that you should obtain from them, should they be willing to furnish the information, a statement of the sum which they propose to expend between the date of your visit of inspection and the 1st July 1869, the latter being the date on which it is probable the transfer of the telegraphs to the Post Office will be effected. Such a statement, if obtained, will be of service hereafter in determining whether the requisite expenditure has taken place.

With a view to assist these gentlemen, applications were made to the Admiralty for information as to the sea beds across which the cables were laid, and as to the risks from navigation or wash of tide or current. Application was also made to the Submarine Company for such information as their experience of the working of submarine cables would enable them to give.

The following passages are extracted from the instructions given to Mr. Walker :—

“ In determining what are the net profits, the question will necessarily arise whether a sufficient sum has been expended during the period above referred to in maintaining the lines and plant in good working order.

“ In conducting your inquiry, this point must be steadily kept in view.

“ Considering the practical experience which you have gained in the construction and maintenance of electric telegraphs, it seems to his Grace unnecessary to specify in detail the precise means which you should adopt in arriving at a correct opinion of the state of the companies' lines and plant. For obvious reasons it will be impracticable for an examination to be made of every wire and all the apparatus included in the three companies' systems, and his Grace must leave, in a great measure, to your discretion the selection of the lines which, being taken as a sample of the whole, may, in your opinion, fairly represent the general condition of the undertakings, and will content himself with merely indicating a few of the points at which during your tour of inspection the lines of the companies should be brought under review.

“ Amongst the most important of the main trunk lines of telegraph, those on the South-western, Great Western, London and North-western, Midland, and Great Eastern Railways, and their tributaries, rank foremost. It would, I think, be well that some portion of the South-western telegraph, say at Basingstoke, should be examined, from whence you will be able conveniently to proceed to points on the Great Western system, taking care to examine the condition of the wires by which communication is maintained through the Box Tunnel. This work being performed, you will probably think it well to proceed to Worcester, from which centre examination can readily be made of the numerous lines belonging to both the Electric and Magnetic Companies converging on that city.

“ His Grace would then wish you to proceed to Birmingham, and thoroughly examine the wires and plant of the companies in that town and its neighbourhood.

“ I may here inform you that it was stated in evidence before the Parliamentary Committee on the Telegraphs Bill, that wires exposed to the smoke of great towns are liable to more especial deterioration than those which are carried through the country, and even in the latter case it is understood that wires carried through manufacturing districts are less durable, and therefore require more frequent renewal than wires that pass through districts in which agricultural pursuits alone are followed. As the greater part of the wires running through the manufacturing districts from Birmingham northwards are no doubt exposed to deteriorating influences, it will be for you to inquire and report how far the prospective profits of the United Kingdom Telegraph Company, if there be any prospect of future profit, are likely to be prejudicially affected by this circumstance.

“ The condition of the wires in these districts will also have an important bearing, as you will hereafter perceive, on the price to be paid for the property of the other companies.

“ In your inspection at Birmingham, and also at any other large towns which you may deem it expedient to visit, you will not, of course, confine your examination to overground wires alone, but you will take care to look into any underground system which may be in operation, testing the wires and satisfying yourself of their efficient insulation.

“ In reporting upon the state of the lines (and a separate report under this head must be made as regards the property of each company) it will not be necessary that you should express an opinion as regards the mode of construction adopted in the first instance, but you will embody any remarks which you may wish to offer in this respect in a separate report, which will no doubt be useful for reference to the Postmaster General's officers hereafter when the Post Office shall have assumed full control of Electric Telegraphs.

“ In your report on the state of the lines, assuming that you should be of opinion that an insufficient sum has been expended by the company in the maintenance thereof, you will endeavour to form an estimate, for the guidance of the arbitrator who may hereafter be called upon to assess the value of the property on behalf of the Post Office, of the amount which should have been expended in keeping up the lines in a thorough state of repair and efficiency.

“ In the event of your being of opinion that the lines are otherwise than in a thorough state of repair and efficiency, you must take care that the estimate above adverted to is not a mere matter of conjecture, but one the accuracy of which you may reasonably expect to be able to maintain before an arbitrator in the event of your being called upon to do so.

“ In considering the matter, it may not be amiss that you should obtain from the companies, should they be willing to furnish the information, a statement of the sum which they propose to expend between the date of your visit of inspection and the 1st July 1869, the latter being the date on which it is probable the transfer of the telegraphs to the Post Office will be effected.

“ Such a statement, if obtained, will be of service hereafter in determining whether the requisite expenditure has taken place.

“ You will understand that, while you will be at liberty to report separately upon any point which may appear to you to require special consideration, and while you are, by the terms of this letter, instructed to make a report upon faults of original construction, and upon improvements which may suggest themselves to you, in the course of the inspection, your report for reference to the arbitrator upon the state of the companies' lines and plant must be full and complete, and leave no point untouched on which it may be expedient he should be informed.

“ From Birmingham it may be well that you should proceed to Rugby, taking the opportunity to look into the state of the wires through Kilsby Tunnel. On the London and North-western line you will find, at least south of Rugby, two lines of telegraph, both the property of the Electric and

International Telegraph Company. The same thing happens on the Great Northern, south of Hitchin. I do not know the date at which the second line was erected, but an examination of a section of both the original and the duplicate line will perhaps be expedient.

"From Rugby you might proceed to Stafford or Crewe, and from thence to Manchester or Liverpool. After completing your enquiries so far, you may consider it convenient to proceed to Ireland, and after inspecting a section of the telegraphs on the Great Southern, and Western and Midland, and Great Western lines, go on to the north of Ireland, examining the property of the Electric and Magnetic Companies in the neighbourhood of Belfast.

"From Belfast steamboats run to Carlisle, at which latter point you might recommence your examination of the lines converging on Carlisle from Manchester and Liverpool on the south, from Glasgow on the north, from Newcastle on the east, and from Dumfries and Ayrshire (including the Stranraer lines) on the west.

"I think you should then go to the north, inspecting the companies' plant at Edinburgh and Glasgow, and some of their lines in Perthshire.

"You must, however, be careful in your inspection to discriminate between the property of the telegraph companies and that of the railway companies; this caution being specially applicable to telegraphs on the North British Railway, on which system telegraphs both for commercial and railway purposes, his Grace is given to understand, are generally blended.

"Your inspection in Scotland being completed, the Duke of Montrose would wish you to return along the east coast route, stopping perhaps at Newcastle, York, or Normanton, Derby and Peterborough. At the last-mentioned town you will have the opportunity of readily inspecting; should you consider it desirable to do so, the telegraphs appertaining to the Great Northern, Midland, North-western, and Great Eastern systems, and you will probably conclude your inspection of provincial telegraphs by visiting Cambridge, through which town both the Electric and Magnetic Companies' wires pass.

"On returning to London it will be necessary that you should inspect the wires by which the metropolitan stations of the companies are connected. These wires, I believe, are chiefly subterranean, and it will be your duty to report upon the condition in which you find them.

"So far you will perceive these are instructions of a general character, and while not inapplicable to the property of the United Kingdom Telegraph Company, refer in the main to the lines, &c. of the Electric and Magnetic Companies.

"I now come to deal more specifically with the case of the United Kingdom Company. The system of this company is comparatively small and simple; it has no lines in Ireland, a few only in Scotland, and its trunk lines in England are almost without exception on the canals and highways. This being so, the Postmaster General being desirous that the inspection should, as already stated, commence with the United Kingdom Company's lines, and being desirous moreover that as the examination of the company's accounts rapidly approaches completion, the whole matter should be ripe for settlement as quickly as possible, will leave it entirely for your judgment to determine at what points your examination of the company's system shall be made, relying upon your using all reasonable despatch in bringing your enquiries to a conclusion.

"Owing to circumstances which I need not enter into, no great progress has yet been made in the examination of any but the United Kingdom Company's accounts.

"Enough has been gathered from the accounts, however, to make it doubtful whether the United Kingdom Company have debited their revenue with a sufficient sum for maintenance during the year to 30th June 1868.

"The accounts of the Electric and International Company, for a series of years, show that the cost of maintenance has been almost uniformly at the rate of $5\frac{1}{2}$ to 6 per cent. per annum on the total sum expended (to the close of each year) in the construction of works.

"Evidence was given by officers of the telegraph companies before the Parliamentary Committee which went to show that somewhere about six per cent. on the cost of construction ought to be expended annually in the maintenance of the works so constructed.

"The accounts of the United Kingdom Company, however, show that since December 1866 the company have never charged themselves for maintenance with as much as three per cent. on the cost of construction.

"It is important to observe that the period at which the charge for maintenance began to decline coincides with that at which the proposal to transfer the telegraphs to the State began to find general favour with the public. It also coincides with the period at which the company began apparently to earn a dividend on their preference shares.

"Under these circumstances it is of the utmost importance that you should ascertain whether the apparent net profits of the company for which the Postmaster-General is to give 20 years purchase have been unduly swelled by insufficient charges on maintenance account.

"Your inquiry under this head may be of two kinds. First, you may endeavour to ascertain whether any portion of the sum really expended in maintenance, and which should have been charged to revenue, has been charged to construction, *i.e.*, to capital.

"In this part of your inquiry you had better perhaps proceed by obtaining from the company's engineers the particulars of the works constructed during the year to 30th June 1868, and ascertaining the fair cost of those works. If it should then appear that the sum actually charged to construction was in excess of the actual cost, the amount of the excess would probably have to be transferred to maintenance in diminution of the apparent profits.

"In dealing with the accounts of another company it has been observed that whereas in former years the cost of materials was divided in varying proportions between construction and maintenance, in the closing year it has been almost entirely charged to construction.

"If any circumstance of this kind should be brought to light in the examination of the accounts of the United Kingdom Company it shall be communicated to you, but it is well that I should direct your attention to the point.

"In the next place you have to inquire whether, irrespective of the manner in which the charges have been brought to account, a sufficient sum has been expended on maintenance.

"You will bear in mind that every diminution of the apparent net profits of the company will not only reduce the sum to be paid by the Postmaster-General for such net profits by 20 times the amount of such diminution, but will also tend to reduce the sum to be paid for prospective profit.

"I mention this to show you that corrections of account, which at first sight appear to be trifling, may be of considerable importance."

Whilst these arrangements were being made for the examination of the accounts and plant of the telegraph companies, other arrangements were made for the appointment of arbitrators in the several cases, and for settling the mode in which the arbitrations should be conducted so soon as the examination of the accounts and plant had been completed. In the completion of these matters much time was unavoidably spent. The printed papers will show how difficult it was for the Department to make any effective progress during the autumn of 1868, and with what extreme slowness the persons with whom it had to arrange moved during the vacation of that year. This, of course, was but natural, but it proved in the long run to be very inconvenient.

The settlement with the various telegraph companies was effected at the following dates :—

With the Electric Company on 25th May 1869.
„ Magnetic Company on 18th May 1869.
„ United Kingdom Company on 10th June 1869.
„ London and Provincial Company on 20th May 1869.
„ Universal Private Company on 6th July 1869.
„ Reuter's Telegram Company on 9th June 1869.

The tedious character of the negotiations may be inferred from the following circumstance, viz., that the formal proceedings in the case of Reuter's Telegram Company commenced on the 15th March 1869, and that the award of the umpire, Mr. Russell Gurney, was not given until the 9th June.

In the case of this company, however, a vast mass of evidence, over and above the general evidence as to accounts and plant, had to be obtained from foreign telegraphic administrations, and from various other sources.

The precise results obtained by the Department from its inspection of plant shall be noted hereafter, but it may be well to state that the sum abated from the purchase money of the undertakings of the companies (Reuter's Telegram Company excepted) on account of real or possible dilapidations and depreciation exceeded 500,000*l*.

I have no means of knowing how much the umpire abated on this head in the case of Reuter's Telegram Company, but it was doubtless considerable.

While these negotiations with the telegraph companies were being carried on, steps were also taken to arrange with the railway companies having a right to call upon the Department to purchase such beneficial interest in telegraphy as they claimed to possess.

While these preparations were being made for the acquisition of the property of the telegraph companies, and for the purchase of the interests of the railway companies in telegraphy, other preparations were made for the re-arrangement of the property to be acquired, and for the organization of a combined system.

The telegraph offices throughout the country were visited, their arrangements inspected, and the amount of accommodation given by them, ascertained. At the same time, the neighbouring post offices to which the business of the telegraph offices was to be transferred were visited, their capacity to afford the required accommodation was ascertained, and plans for their re-arrangement were framed.

The various forms of instrument in use by the telegraph companies were examined, and reports upon their relative merits were obtained from competent authorities, our object being, of course, to ascertain which instruments would be best suited to each of the various branches of our work.

We also endeavoured to ascertain whether it was not possible to effect some improvements in some of the instruments and other scientific appliances then in use, and, as will be seen hereafter, we attained a certain amount of success.

At the same time we examined the different codes in use amongst the companies for signalling, ascertained which of them it would be best to adopt as the universal code,

and took such steps, as it was possible to take, to arrange for the future assimilation of codes. To this subject I shall have hereafter to refer.

Inquiries were also instituted as to the working of the telegraphic systems on the Continent, and especially as to the systems of Pneumatic tube in use in Paris and in Berlin.

Full and detailed information was obtained from the telegraph companies as to the position, pay, and emoluments of their staff throughout the country, and as to the character and qualifications of every member of the staff.

Lastly, with a view to the re-distribution of the telegraphic plant after its acquisition, the telegraph companies were required to furnish returns of all their circuits, accompanied by statements of the instruments in use on those circuits, and line plans showing the direction of every wire in the kingdom, and the purpose to which it was applied. At the same time, the railway companies were required to furnish schedules, and when it was necessary, plans of the wires required by them for the establishment of an independent system.

These materials having been obtained, a plan of re-distribution and further development was prepared, and the course proposed for every wire of the combined and extended system was laid down on maps of large scale.

The general principles of the scheme of re-distribution and development may be gathered from the following extracts from a memorandum drawn up by Mr. Baines in March 1869.

"The following observations explain the principles on which it is proposed to proceed in adapting the lines of the several electric telegraph companies whose property is about to be acquired to the system of Post Office telegraphs, and in laying out the new lines which will be requisite in order to render that system complete.

"In preparing the line maps of the Post Office telegraphs, only such of the existing wires have been taken into account as are shown by the line plans rendered by the companies to be commercial wires used solely for public business. All other wires, whether used for railway purposes only, or used jointly for railway and commercial purposes, have been left out of the Post Office scheme altogether.

"The chief points of the Post Office scheme are, as a matter of course, the head offices at post towns, and the great object to be kept in view is the giving to these offices, as far as may be practicable and convenient, direct communication with each other.

"In order that this end may be attained, it is assumed that all the post towns in each of the three countries shall have at least one instrument that is common to all. As England and Wales and Scotland are practically one country, it will probably be convenient to deal with them as such. In this case it is assumed that a Morse printing instrument will be put in at each head post office in Great Britain. At the larger head offices two or more Morse printers will be required, and at the very largest the Wheatstone automatic instrument will no doubt be brought into use.

"To work out the system of direct transmission between head offices, the principal wires may be dealt with as being arranged in three classes:—

- "1. Direct wires, connecting the great towns and centres of business, without any intermediate stations on which the automatic printer may be profitably employed, or on which it may be decided to work the Hughes' type printer; as, for example, a wire between London and Manchester, London and Newcastle, London and Glasgow, and so on.

The length of these wires will be constant; that is to say, they will never be switched on at their terminal points to an extension, nor will they ever be cut in two or diverted at an intermediate point.

- "2. Wires for local and general use between head offices, with or without intermediate head offices, on the same wire.

- "3. Wires kept as clear as possible from local work, and set apart mainly for the purpose of giving the smaller post towns occasional direct communication through one principal head office over a main trunk wire to another principal head office; as, for example, the manufacturing towns of North Lancashire,—Accrington, Bury, Bolton, Blackburn, Burnley, and so on,—which would, in the ordinary course, send their telegrams for London "forward" on Manchester, would, by the means above described, have the power of sending their messages direct to London, although connected up with Manchester, possibly by different circuits.

* * * * *

"With the view of avoiding unnecessary expense, wires, which it would appear will become "spare" on the amalgamation of the several systems, have been allotted to the service of towns not at present provided with independent means of communication; but, in all cases in which this has been done, care has been taken to provide the towns, from the direct service of which such wire has been withdrawn, with equally good communication by some other means. As an example, the wire by which direct communication is maintained between Nottingham and Manchester *via* Derby, has been taken up westward of Derby for the service of Matlock, Bath, Bakewell, and Buxton, but by joining up at Sheffield a local United Kingdom wire, which runs from Nottingham direct to Sheffield, to an electric wire running from Sheffield to Manchester, an equally good communication will be established between Nottingham and Manchester, while the old route *via* Derby will still be to some extent available.

"Again, it is proposed to appropriate a direct Magnetic wire between Leeds and Bradford, and one between Bradford and Manchester, for the service of several intermediate sub-offices, dividing the wire into appropriate lengths, according to the number of offices to be grouped on each section. The remaining wires of the Magnetic Company, and the wires of the Electric and United Kingdom Companies, will still afford ample means of communication between Leeds and Bradford and

Manchester. Once more, a section of the Electric wire from London to Aberdeen has been cut out between Perth and Friockheim for the service of Cupar Angus, Blairgowrie, Meigle, Kirriemuir, and Forfar; but this gap has been made good by appropriating the Perth and Dundee section of the Edinburgh and Dundee wire (Stirling route), and joining it up at Dundee to the Edinburgh and Montrose wire, by which the new Aberdeen wire is continued to Friockheim, where it rejoins the original Aberdeen wire. The remainder of the Montrose wire between Friockheim and Montrose is joined at the former point to the wire which has been appropriated for Forfar and other towns. Montrose will get its direct communication with Edinburgh and Aberdeen by United Kingdom wire, and Dundee will get its direct communication with Edinburgh *viâ* Ladybank, instead of *viâ* Perth.

"Care has, however, been taken to make alterations in the existing system only, where a harmonious working of the amalgamated system demands that they should be made. As soon as the new system shall have been brought into working order, very many minor alterations which will not, in the first instance, be absolutely needful, can then be made with advantage. These future alterations will mainly have for their object the connecting of subsidiary lines with main trunk wires, so as to give to second-rate post towns more direct communications with other post towns than may, in the first instance, be provided for.

"It seems prudent to defer these minor alterations until a future period, because experience will better enable us to determine how far duplicate main trunk wires can be dispensed with for the purpose indicated, and because, in the transition stage of the telegraphs from private to State control, sufficient difficulty will probably be encountered in the mere amalgamation of offices and redistribution of staff. In like manner, the distribution of relays is a matter which does not press for immediate consideration, and may very well be left for adjustment when the system is in working order.

SUB-OFFICES.

"The principle on which the circulation of sub-offices has been arranged is very simple.

"It would be unreasonable to expect that sub-postmasters and letter receivers, who have their own private business and customers to attend to, will be able to give the same close attention to the "call" of another office that the Post Office will exact from its established clerks. Nor can it be expected that the comparatively small business, which may be looked for at sub-offices, will afford sub-postmasters that degree of practice which alone can ensure expert manipulation.

"To put sub-offices in circuit with through lines could, therefore, have but the effect of clogging the lines, diminishing their carrying capacity, and delaying the work.

"Subordinate lines have, consequently, been provided in almost every case for the service of subordinate offices. These lines are arranged to work out of a head office, not necessarily the sub-offices' postal head office, but that office from which, all things considered, they can be most conveniently served."

In commenting on the memorandum from which the foregoing extracts are taken, Mr. Culley wrote thus:—

"I quite agree in the principle laid down of interchanging and connecting the wires of the different companies. A very considerable improvement in the communication may thus be effected without any appreciable expense, and will be a great advantage to the public."

The following are a few illustrations of the advantages which have been derived from the interchanging and connecting of the wires of the different companies, and which could not have been obtained without an amalgamation of the systems. They might be multiplied largely, and have been selected mainly because they are simple and easily to be understood. Prior to the transfer, the communication between Leeds and Derby was circuitous and defective, but by joining at Sheffield a wire of the Electric Company from Derby to Sheffield, to a wire of the United Kingdom Company from Leeds to Sheffield, the Department has put Leeds and Derby in direct communication, without depriving either town of communication with Sheffield. So also the communication between Aberdeen and Leith has been improved by the joining together of an Electric wire from Leith *viâ* Edinburgh to Perth, a Magnetic wire from Perth to Dundee, and a United Kingdom wire from Dundee to Aberdeen.

Again, the communication between Leith and Greenock has been improved by joining up an Electric wire from Leith *viâ* Edinburgh to Glasgow, to a United Kingdom wire from Glasgow to Greenock.

The two following cases require a diagram to make them quite clear, but they may be stated thus:—

A.

The Magnetic Company had a wire from Bristol *viâ* Gloucester and Birmingham to London. The United Kingdom Company had a wire from Gloucester to Uxbridge. The Department has cut the Magnetic wire at Gloucester and at Birmingham, and has joined the Bristol and Gloucester length to the United Kingdom wire from Gloucester to Uxbridge, which wire it has connected with London by a fresh erection from

Uxbridge. It has thus obtained in place of one London and Bristol circuit, and one practically useless line from Gloucester to Uxbridge, the following valuable circuits :—

1. London and Bristol.
2. London and Birmingham.
3. Birmingham and Gloucester, with Bromyard, Droitwich, and Worcester intermediate.

B.

The Magnetic Company had a wire from Cardiff *via* Gloucester and Birmingham to London. The United Kingdom Company had a wire from Gloucester *via* Oxford to Birmingham.

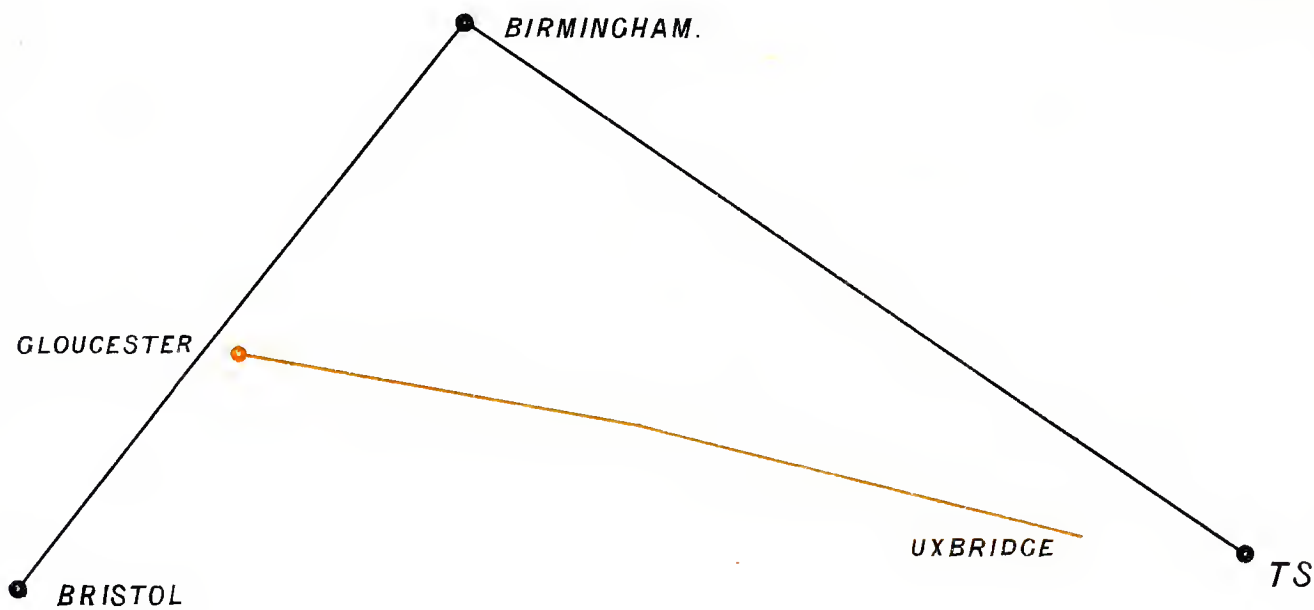
The Department has erected a wire from Oxford to London, and has thus got the following circuits :—

1. London to Cardiff.
2. London to Birmingham.
3. Birmingham to Gloucester.
4. Birmingham to Oxford.

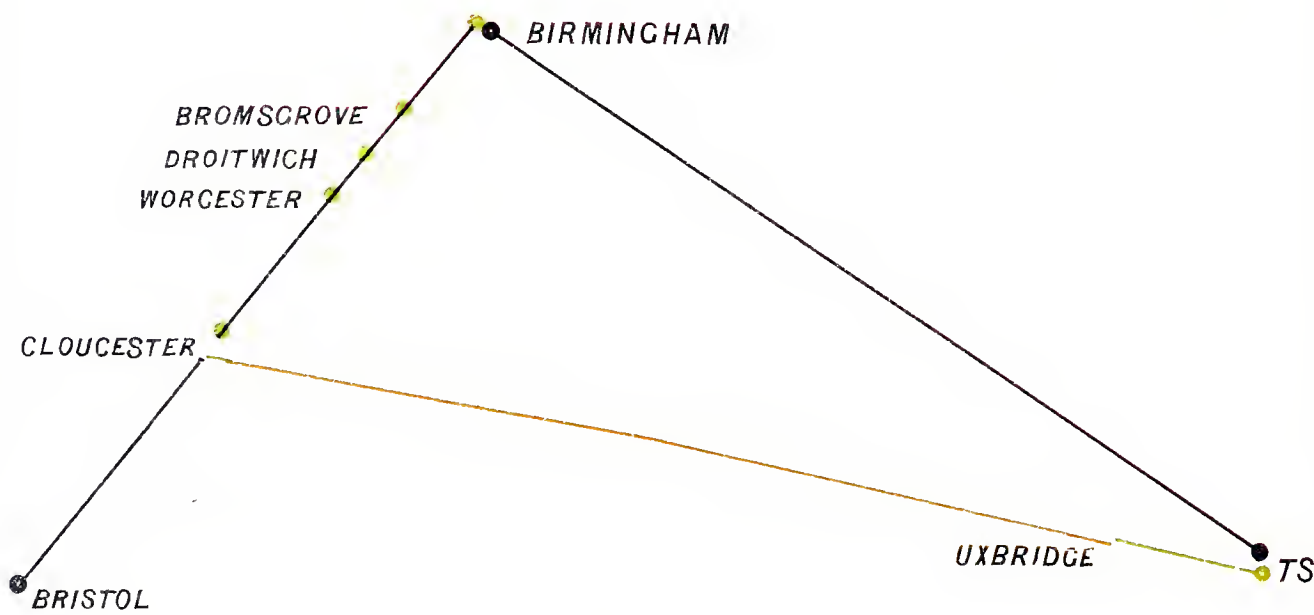
In the room of—

1. London to Cardiff.
2. Gloucester to Oxford and Birmingham.

The following diagram will make these cases clear :—



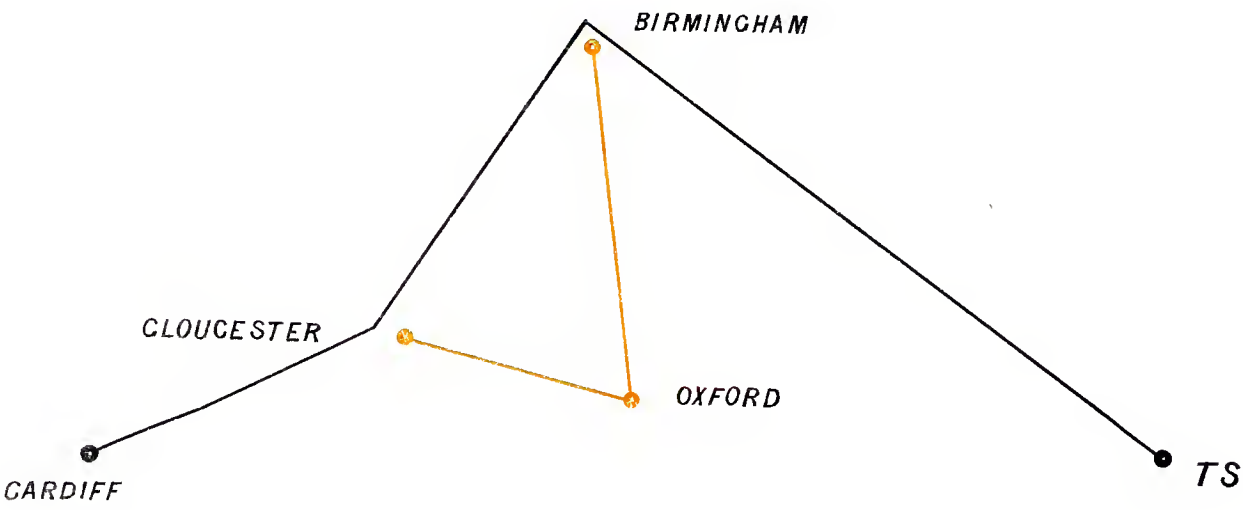
FORMER ARRANGEMENT.



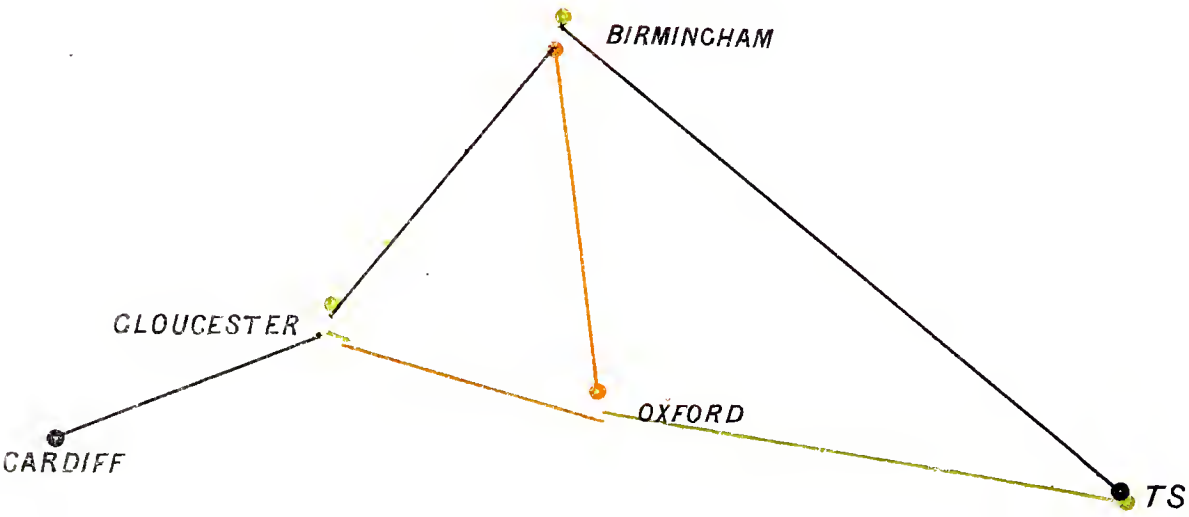
PRESENT ARRANGEMENT.

EXPLANATION.

- Old wires of Magnetic Company —————
- " " United Kingdom " ————
- New wire erected by Post Office ————



FORMER ARRANGEMENT.



PRESENT ARRANGEMENT.

EXPLANATION.

- Old wires of Magnetic Company —————
- " " Traded Kingdom " ————
- New wire erected by Post Office —————

I shall have hereafter to describe some still more important arrangements for straightening circuits, when I come to treat of the new wires now in course of erection, but the foregoing illustrations will suffice to show the manner in which the Department set about making the best use of the various systems which it had to combine. Another important advantage has been gained by the separation, in some cases, of the two wires forming double-needle circuits, and by the substitution of single-needle or printing instruments for the double-needle instruments. The Department has gained in this way, *inter alia*, an additional line from London to Portsmouth, and an additional line from London to Dover.

Steps taken after the passing of the Money Bill.

The foregoing statements will probably show conclusively that the Department spared no pains in the preparation of its plans between the passing of the Act of 1868, and the passing of that of 1869. No actual work, however, could be done until after the latter Act was passed, and, as I have already stated, it was not passed until August 1869. As soon as it was passed the Department began vigorously—

- (a.) To erect the additional wires required for the completion of its scheme :
- (b.) To re-arrange such of the telegraph offices as it designed to keep, and to fit up such post offices as it designed to open for telegraph business :
- (c.) To arrange for the redistribution of the old staff, and for the training of additional staff :
- (d.) To prepare uniform codes and regulations in lieu of the varying codes and regulations of the companies :
- (e.) To carry out the amalgamation by degrees, wherever gradual amalgamation was practicable.

(a.)—LINE WORKS.

It was decided that the re-arrangement of the old and the erection of the new lines should be entrusted mainly to the telegraph companies whose officers were for that purpose to act as officers of the Department, even before the transfer took place. This course was necessary on more than one ground. In the first place, every part of the work necessitated a certain amount of meddling, as it were, with lines in actual use, and could not well have been entrusted to any but those who had the management of the lines in actual use. In the second place, the work which we had to do was so large that unless we had made use of the large force in the service of the telegraph companies, no sufficient force for the work could have been procured. Each company was entrusted with the re-arrangement of its own system, and with the erection of the wires looping off from that system, and all the companies were made acquainted with the mode in which, where two systems met or crossed, the combined re-arrangement was to be effected. In like manner the South-eastern, London and Brighton, London Chatham and Dover, North British, and Caledonian Railway Companies, undertook the extensions which affected their independent systems of telegraph.

Mr. Bartholomew, whom I have already mentioned as having examined telegraph plant for the Department, and Mr. Lyttle of this office, were employed to bring into the general scheme the numerous small branch lines, such as the Poole and Bournemouth, the Abergavenny and Crickhowell, the Bodmin and Wadebridge, and others which had been acquired by the Department.

The work to be done was shown on specifications, of which the following are specimens selected from about 300. The wire plans and specifications were prepared under the direct superintendence of Mr. Baines, who was largely assisted by Mr. Patey and Mr. Cooke, and in respect of London by Mr. Taylor.



GENERAL POST OFFICE.

SPECIFICATION of WORK to be done in adapting the system of the Electric and International Telegraph Company, on the *Great Eastern* Railway, to the requirements of the Post Office system of Telegraphs.

Section from *Wickham Market* to *Lowestoft*. Specification No. 7

MEMORANDUM.—The object in view is the establishment of the Circuits described in the subjoined table. Some of these Circuits will be entirely new, in which case the instruments will be at once joined up in each of the Post Offices included in the Circuit, and connected with batteries so as to be available for immediate use. Other circuits will be formed by altering or extending existing Circuits, and by removing instruments now at Railway Offices into the corresponding local Post Offices. In these latter cases care must be taken not to interfere with the working of the existing Circuits, but to fix the instruments, and so to leave the Wires that, when the time arrives for the transfer of the Company's Telegraphs to the Post Office, the Circuits to be re-arranged may be joined up at the shortest possible notice.

No.	Circuit From	To	Wire Gauge No.	Description of Instrument	Intermediate Stations	Switches at
1	<i>Ipwich</i>	<i>Lowestoft</i>	8	<i>Printer</i>	<i>Saxmundham, Wangford, Halesworth</i>	
2	<i>Wickham Market</i>	<i>Framlingham</i>	11	<i>Single Needle</i>	<i>Beeches.</i>	
3	<i>Goxford</i>	<i>Aldborough</i>	11	<i>Do</i>	<i>Saxmundham, Leiston.</i>	
4	<i>Kessingland</i>	<i>Southwold</i>	11	<i>Do</i>	<i>Wrentham, Langford.</i>	
5	<i>Harleston</i>	<i>Lowestoft</i>	8	<i>Printer</i>	<i>Bungay, Beeches.</i>	
6	<i>Bungay.</i>	<i>Brooke</i>	11	<i>Single Needle</i>	<i>Soddon</i>	
7						
8						
9						
10						

DIAGRAM OF THE WORK TO BE DONE.

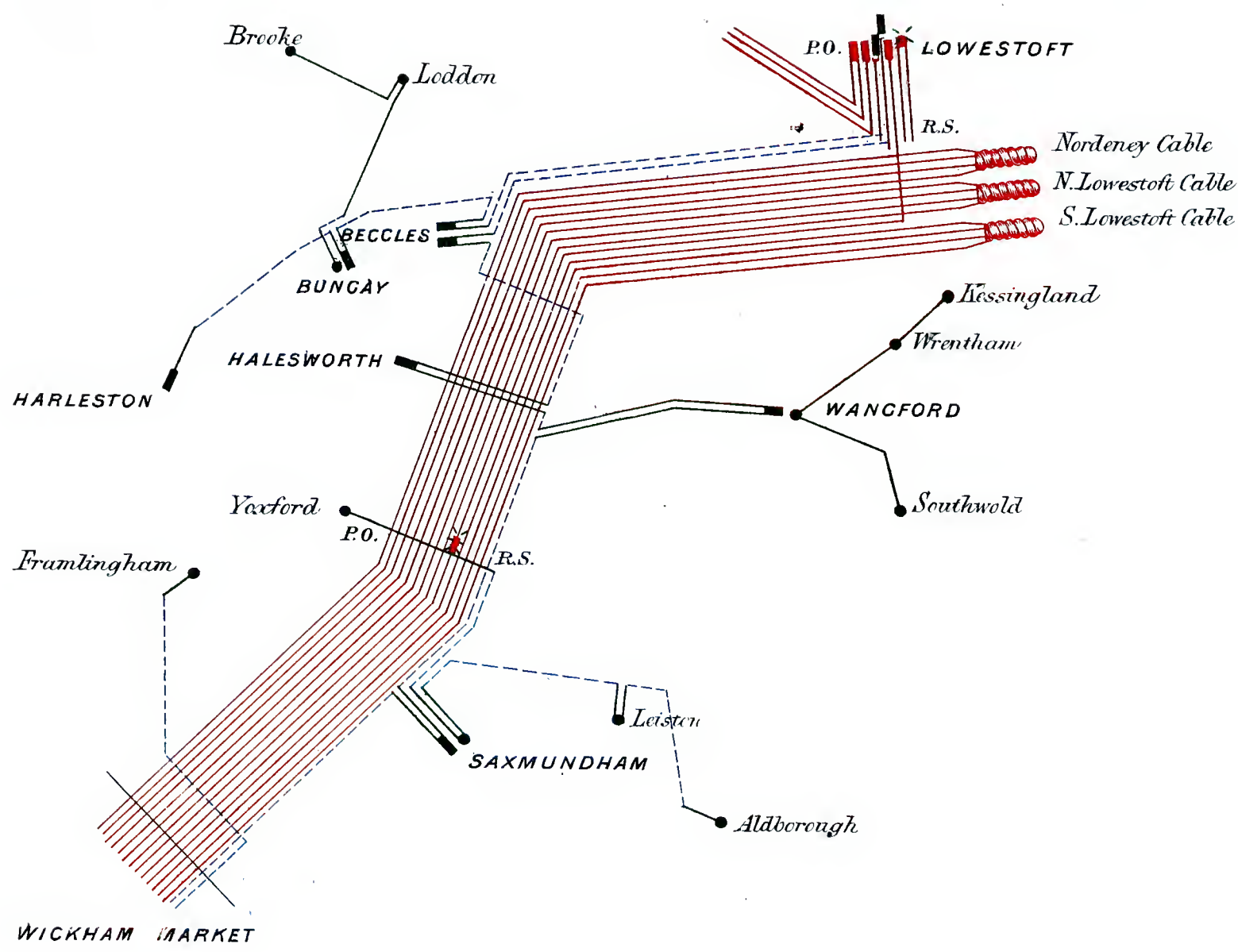
Showing the number and course of the Wires—distinguishing new Wire work with new Poles from new Wire on existing Poles, open-work, covered work, submarine work and also offices where Instruments are to be changed, placed or removed.

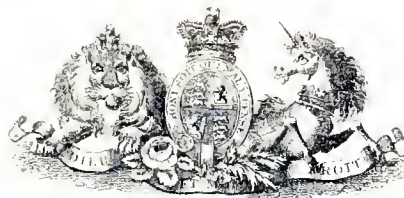
EXPLANATION :—Existing Wires of the Company, *red*; other Companies' Wires, *black*. Post-Office additions on new Poles—on Roads, *green*; on Railways, *dotted green*. On existing Poles—on Roads, *blue*; on Railways, *dotted blue*. Instruments :—The Company's, *red*; other Companies', *black*; new Instruments, *green*. Printers shown by *oblong marks*; Single Needles by *discs*; Bright's Bells by *triangular marks*; Alphabetical Instruments by *circles*. Abbreviations :—P.O., Post Office; R.S., Railway Station.

C. M. 49, 50, 55 67.

Brooke

P.O. LOWESTOFT





GENERAL POST OFFICE.

DESCRIPTION of WORK to be done in adapting the system of the Electric and International Telegraph Company, on the *North Eastern* Railway, to the requirements of the Post Office system of Telegraphs.

Section from *Berwick* to *Newcastle* including *North Shields*. Specification No. *///*

MEMORANDUM.—The object in view is the establishment of the Circuits described in the subjoined table. Some of these Circuits will be entirely new, in which case the instruments will be at once joined up in each of the Post Offices included in the Circuit, and connected with batteries so as to be available for immediate use. Other circuits will be formed by altering or extending existing Circuits, and by removing instruments now at Railway Offices into the corresponding local Post Offices. In these latter cases care must be taken not to interfere with the working of the existing Circuits, but to fix the instruments, and so to leave the Wires that, when the time arrives for the transfer of the Company's Telegraphs to the Post Office, the Circuits to be re-arranged may be joined up at the shortest possible notice.

No.	Circuit From	To	Wire Gauge No.	Description of Instrument	Intermediate Stations	Switches at
1	<i>Berwick</i>	<i>Kelso</i>	<i>8</i>	<i>Printer</i>	_____	
2	<i>Berwick</i>	<i>Norham</i>	<i>11</i>	<i>Single Needle</i>	_____	
3	<i>Kelso</i>	<i>Gesholm</i>	<i>11</i>	<i>Do</i>	_____	
4	<i>Beal</i>	<i>Wooler</i>	<i>11</i>	<i>Do</i>	<i>Belford</i>	
5	<i>Chathill</i>	<i>North Sunderland</i>	<i>11</i>	<i>Do</i>	_____	
6	<i>Alnwick</i>	<i>Ellanton</i>	<i>11</i>	<i>Do</i>	_____	
7	<i>Amble</i>	<i>Rothbury</i>	<i>11</i>	<i>Do</i>	<i>Acklington, Felton</i>	
8	<i>Morpeth</i>	<i>Falstone</i>	<i>11</i>	<i>Do</i>	<i>Gambo, Bellingham,</i>	
9	<i>Newcastle</i>	<i>Willington Quay</i>	<i>11</i>	<i>Do</i>	<i>Walker, Wallsend.</i>	
10						

DIAGRAM OF THE WORK TO BE DONE.

Showing the number and course of the Wires—distinguishing new Wire work with new Poles from new Wire on existing Poles, open-work, covered work, submarine work and also offices where Instruments are to be changed, placed or removed.

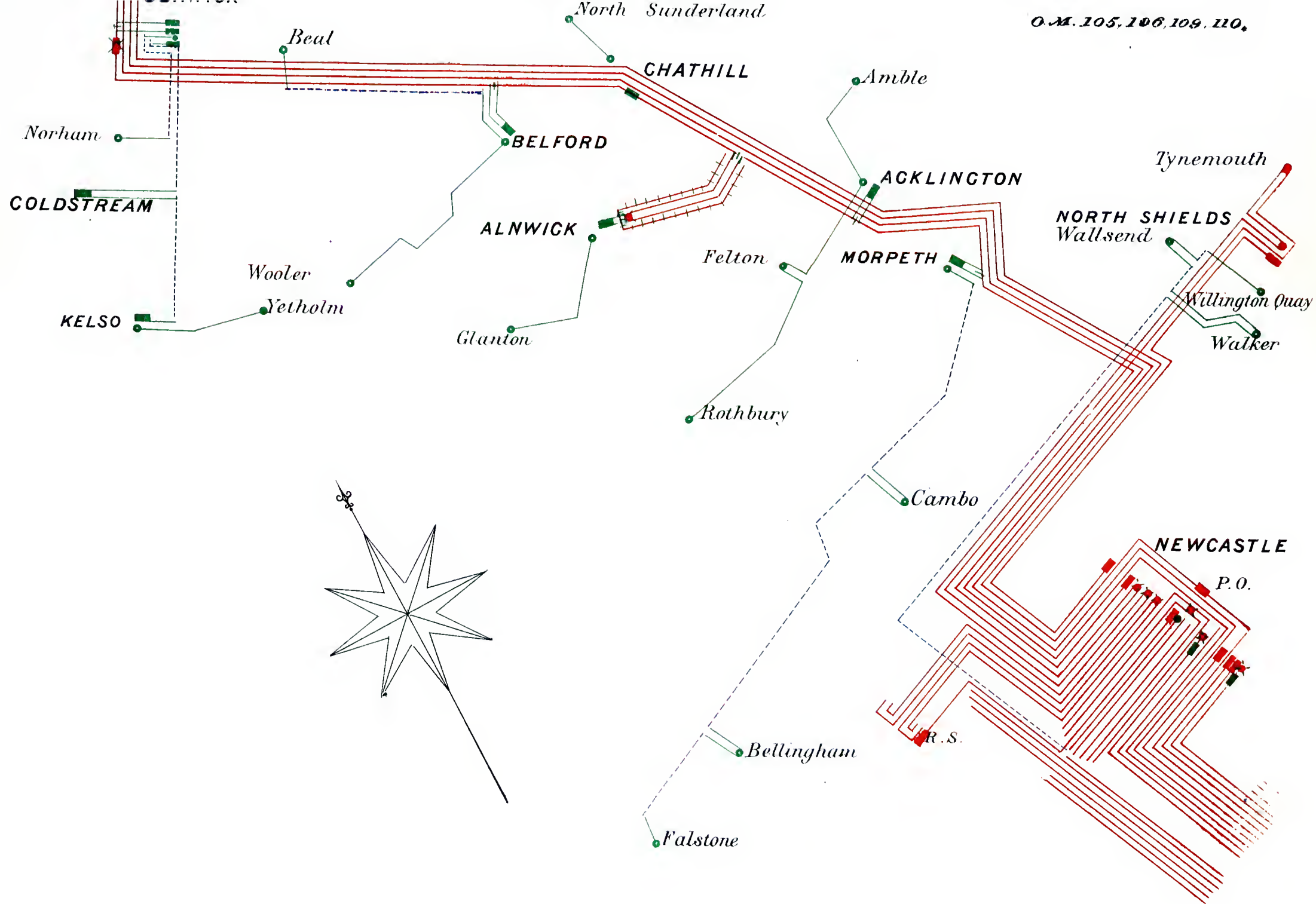
EXPLANATION :—Existing Wires of the Company, *red*; other Companies' Wires, *black*. Post-Office additions on new Poles—on Roads, *green*; on Railways, *dotted green*. On existing Poles—on Roads, *blue*; on Railways, *dotted blue*. Instruments :—The Company's, *red*; other Companies', *black*; new Instruments, *green*. Printers shown by *oblong marks*; Single Needles by *discs*; Bright's Bells by *triangular marks*; Magnetic Bells by *crosses*; Alphabetical Instruments by *circles*. Abbreviations :—P.O., Post Office. R.S., Railway Station.

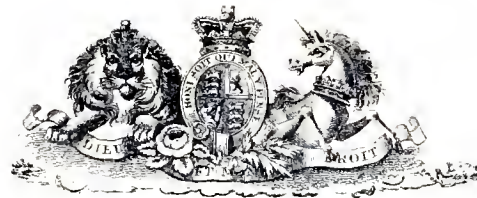
BERWICK

North Sunderland

O.M. 105, 106, 109, 110.

Beal





GENERAL POST OFFICE.

SPECIFICATION of WORK to be done in adapting the system of the Electric and International Telegraph Company, on the *Great Eastern Railway*, to the requirements of the Post Office system of Telegraphs.

Section from *Wymondham* to *Wells* . Specification No. 13.

MEMORANDUM.—The object in view is the establishment of the Circuits described in the subjoined table. Some of these Circuits will be entirely new, in which case the instruments will be at once joined up in each of the Post Offices included in the Circuit, and connected with batteries so as to be available for immediate use. Other circuits will be formed by altering or extending existing Circuits, and by removing instruments now at Railway Offices into the corresponding local Post Offices. In these latter cases care must be taken not to interfere with the working of the existing Circuits, but to fix the instruments, and so to leave the Wires that, when the time arrives for the transfer of the Company's Telegraphs to the Post Office, the Circuits to be re-arranged may be joined up at the shortest possible notice.

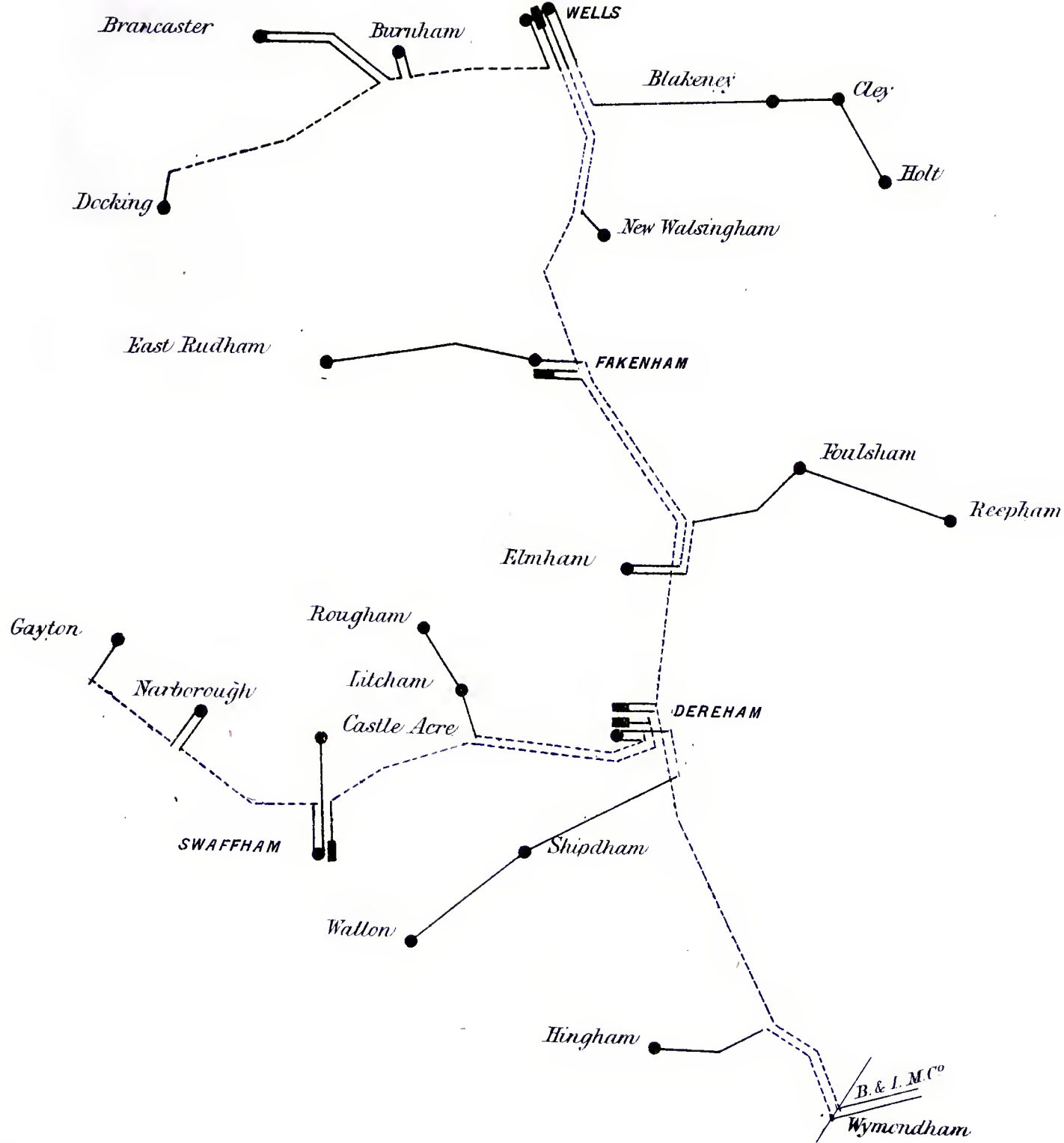
No.	Circuit From	To	Wire Gauge No.	Description of Instrument	Intermediate Stations	Switches at
1	<i>Wymondham</i>	<i>Wells</i>	8	<i>Printer</i>	<i>Dereham, Fakenham</i>	
2	<i>Dereham</i>	<i>Swaffham</i>	8	<i>Do</i>		
3	<i>Wymondham</i>	<i>Hingham</i>	11	<i>Single Needle</i>		
4	<i>Rougham</i>	<i>Wotton</i>	11	<i>Do</i>	<i>Litcham, Dereham, Shipdham,</i>	
5	<i>Castle Acre</i>	<i>Norborough</i>	11	<i>Do</i>	<i>Swaffham</i>	
6	<i>East Rudham</i>	<i>Reepham</i>	11	<i>Do</i>	<i>Fakenham, Elmham, Southerham</i>	
7	<i>Holt</i>	<i>New Walsingham</i>	11	<i>Do</i>	<i>Cley, Wells</i>	
8	<i>Wells</i>	<i>Dockring</i>	11	<i>Do</i>	<i>Burnham, Brancaster</i>	
9						
10						

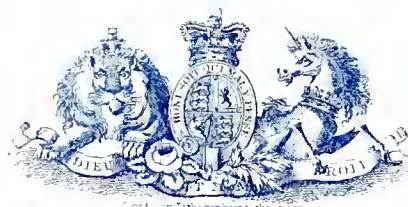
DIAGRAM OF THE WORK TO BE DONE.

Showing the number and course of the Wires—distinguishing new Wire work with new Poles from new Wire on existing Poles, open-work, covered work, submarine work and also offices where Instruments are to be changed, placed or removed.

EXPLANATION:—Existing Wires of the Company, *red*; other Companies' Wires, *black*. Post-Office additions on new Poles—on Roads, *green*; on Railways, *dotted green*. On existing Poles—on Roads, *blue*; on Railways, *dotted blue*. Instruments:—The Company's, *red*; other Companies', *black*; new Instruments, *green*. Printers shown by *oblong marks*; Single Needles by *discs*; Bright's Bells by *triangular marks*; Magnetic Bells by *crosses*; Alphabetical Instruments by *circles*. Abbreviations:—P.O., Post Office; R.S., Railway Station.







GENERAL POST OFFICE.

SPECIFICATION of WORK to be done in adapting the system of the British and Irish Magnetic Telegraph Company to the requirements of the Post Office system of Telegraphs.

Section from *London* to *Cambridge*. Specification No. 1

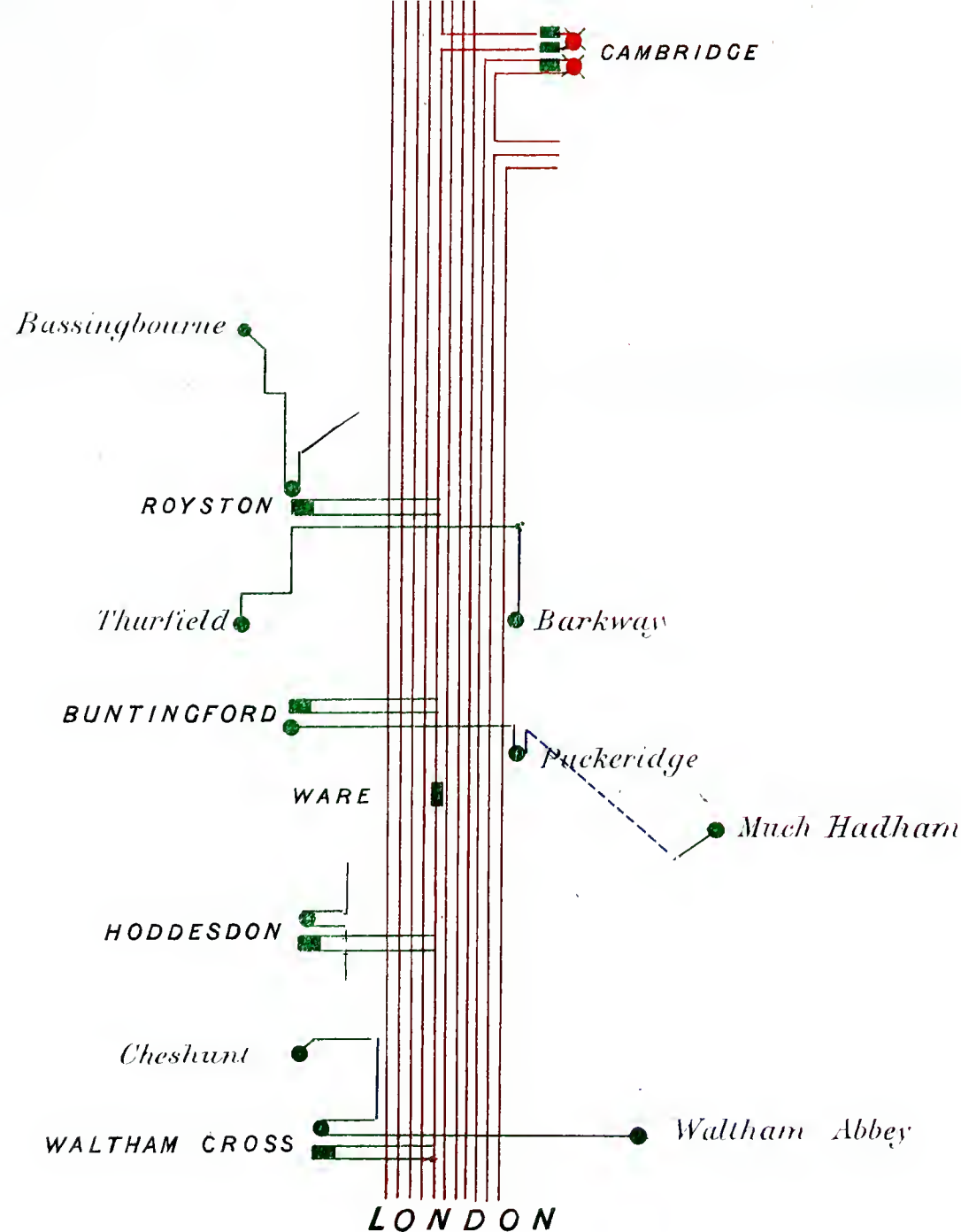
MEMORANDUM.—The object in view is the establishment of the Circuits described in the subjoined table. Some of these Circuits will be entirely new, in which case the instruments will be at once joined up in each of the Post Offices included in the Circuit, and connected with batteries so as to be available for immediate use. Other circuits will be formed by altering or extending existing Circuits, and by removing instruments now at Railway Offices into the corresponding local Post Offices. In these latter cases care must be taken not to interfere with the working of the existing Circuits, but to fix the instruments, and so to leave the Wires that, when the time arrives for the transfer of the Company's Telegraphs to the Post Office, the Circuits to be re-arranged may be joined up at the shortest possible notice.

No.	Circuit From	To	Wire Gauge No.	Description of Instrument	Intermediate Stations	Switches at
1	<i>London</i>	<i>Cambridge</i>	<i>8</i>	<i>Printer</i>	<i>Waltham Cross Haddesdon</i>	
2	<i>Chestnut</i>	<i>Waltham Abbey</i>	<i>11</i>	<i>Single Needle</i>	<i>Buntingford, Royston.</i>	
3	<i>Buntingford</i>	<i>Much Hadham</i>	<i>11</i>	<i>Off</i>	<i>Waltham Cross</i>	
4	<i>Barkway</i>	<i>Tharfield</i>	<i>11</i>	<i>Off</i>	<i>Puckeridge</i>	
5	<i>Bassingbourne</i>	<i>Royston &c</i>	<i>11</i>	<i>Off</i>	<i>Royston</i>	
6						
7						
8						
9						
10						

DIAGRAM OF THE WORK TO BE DONE.

Showing the number and course of the Wires—distinguishing new Wire work with new Poles from new Wire on existing Poles, open-work, covered work, submarine work and also offices where Instruments are to be changed, placed or removed.

EXPLANATION :—Existing Wires of the Company, *red*; other Companies' Wires, *black*. Post-Office additions on new Poles—on Roads, *green*; on Railways, *dotted green*. On existing Poles—on Roads, *blue*; on Railways, *dotted blue*. Instruments :—The Company's, *red*; other Companies', *black*; new Instruments, *green*. Printers shown by *oblong marks*; Single Needles by *discs*; Bright's Bells by *triangular marks*; Magnetic Bells by *crosses*; Alphabetical Instruments by *circles*. Abbreviations :—P.O., Post Office; R.S., Railway Station.



* * In returning these papers the District Superintendent will mark the diagram drawn above so as to show the position, names, and lengths of Tunnels, and whether the Wires are carried through or over them, and in what manner. If a spare Half-arm or Wire is to be used, the fact should be stated, together with any additional particulars.



GENERAL POST OFFICE.

SPECIFICATION of WORK to be done in adapting the system of the British and Irish Magnetic Telegraph Company to the requirements of the Post Office system of Telegraphs.

Section from *Dublin* to *Dundalk*. Specification No. *27*.

MEMORANDUM.—The object in view is the establishment of the Circuits described in the subjoined table. Some of these Circuits will be entirely new, in which case the instruments will be at once joined up in each of the Post Offices included in the Circuit, and connected with batteries so as to be available for immediate use. Other circuits will be formed by altering or extending existing Circuits, and by removing instruments now at Railway Offices into the corresponding local Post Offices. In these latter cases care must be taken not to interfere with the working of the existing Circuits, but to fix the instruments, and so to leave the Wires that, when the time arrives for the transfer of the Company's Telegraphs to the Post Office, the Circuits to be re-arranged may be joined up at the shortest possible notice.

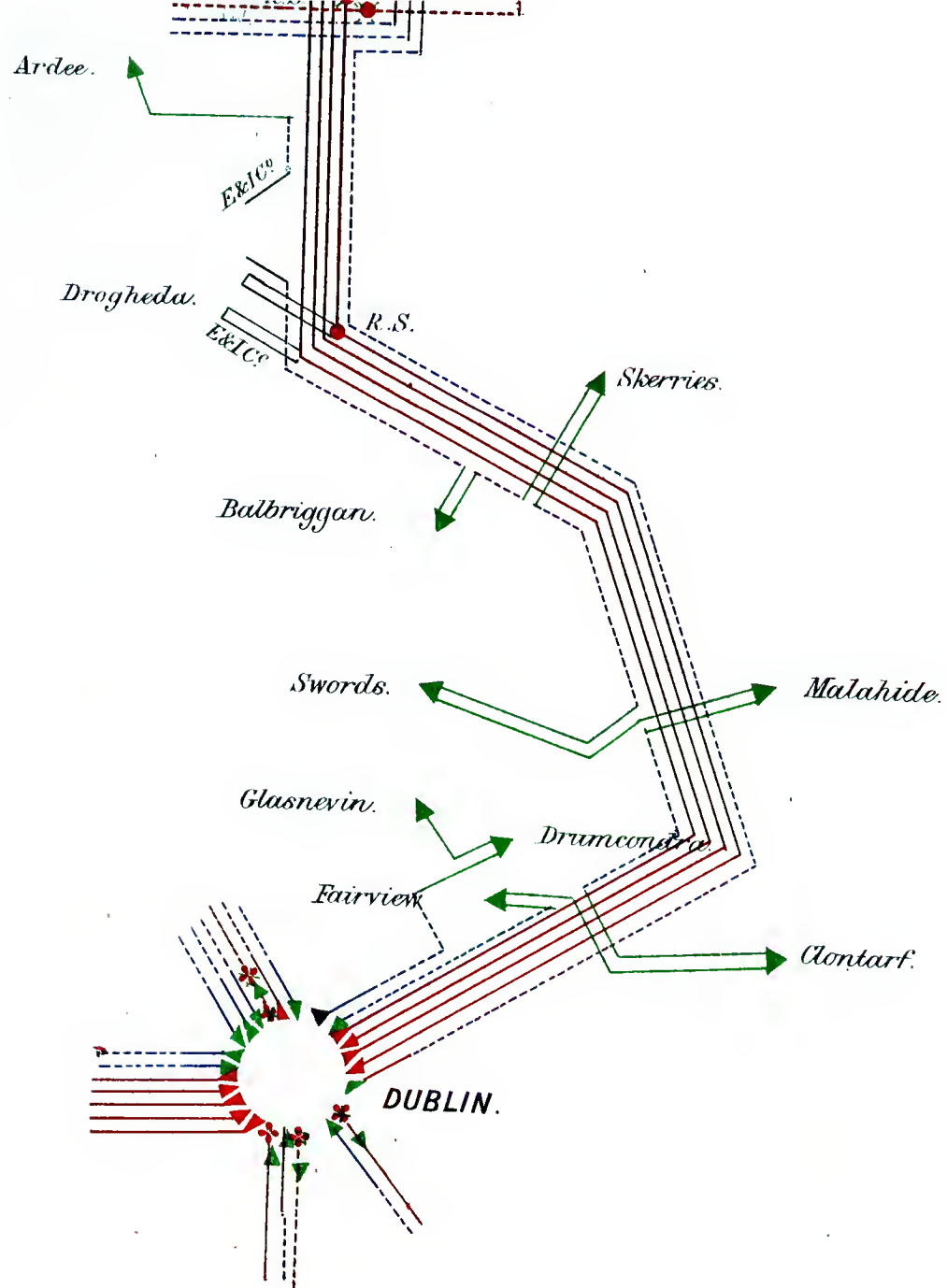
No.	Circuit From	To	Wire Gauge No	Description of Instrument	Intermediate Stations	Switches at
1	<i>Dublin</i>	<i>Glasnevin</i>	<i>11</i>	<i>Bright's Bell</i>	<i>Drumcondra</i>	
2	<i>Dublin</i>	<i>Balbriggan</i>	<i>11</i>	<i>do.</i>	<i>Fair View, Clontarf, Malahide, Swords, Skerries.</i>	
3						
4						
5						
6						
7						
8						
9						
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DIAGRAM OF THE WORK TO BE DONE.

Showing the number and course of the Wires—distinguishing new Wire work with new Poles from new Wire on existing Poles, open-work, covered work, submarine work and also offices where Instruments are to be changed, placed or removed.

EXPLANATION :—Existing Wires of the Company, *red*; other Companies' Wires, *black*. Post-Office additions on new Poles—on Roads, *green*; on Railways, *dotted green*. On existing Poles—on Roads, *blue*, on Railways, *dotted blue*. Instruments :—The Company's, *red*; other Companies', *black*; new Instruments, *green*. Printers shown by *oblong marks*; Single Needles by *discs*; Bright's Bells by *triangular marks*; Magnetic Bells by *crosses*; Alphabetical Instruments by *circles*. Abbreviations :—P.O., Post Office; R.S., Railway Station.





Various circumstances combined to retard the prosecution of the work. In the first place, it was necessary to obtain a vast number of consents from landowners, householders, local boards, and turnpike boards, before the extensions could be put in hand. In three months no less than 4,400 consents were applied for, and 4,200 obtained ; but of course not without considerable labour and much correspondence. Mr. Brown had charge of this duty, and conducted it in a very satisfactory manner. In many cases it was necessary to send an officer from London to the persons whose consent was required in order that he might explain our views, and remove misapprehension, and conciliate opponents. Mr. Yates, both before and since the transfer, has rendered good service to the Department in this way.

The work was still further retarded by the want of materials.

Poles, to have been fit for use at that time, should have been cut in the previous winter ; and, as the Department was not in a position to invite tenders in the previous winter, but few poles had been cut either here or abroad.

Wire, of which we required a great quantity, could not be obtained from more than a few manufacturers, and some of these were compelled to erect additional machinery before they could make any reasonable approach to the supply which we required. Arms, insulators, brackets, and batteries came in with equal slowness. Our difficulty with regard to instruments was even greater. The mechanics, who in this country are capable of making telegraph instruments, are but few in number ; and there was much reason to fear that if we put too great a pressure on the manufacturers for the execution of large orders their men would strike. Eventually the difficulty of obtaining a sufficient number of printing or recording instruments at the outset proved insurmountable, and we were compelled almost at the last moment to greatly modify our plans, and to open many stations with the single needle, which is a much less expeditious and satisfactory instrument. Our difficulties in regard to instruments extended far into last year, and were aggravated on the outbreak of the war by the withdrawal from this country of a large number of German instrument makers. Lastly, as the autumn drew to an end and the winter came on, short days and bad weather opposed fresh impediments to the work.

(b.)—OFFICES.

The Department, as I have stated, had to re-arrange certain telegraph offices which it designed to keep, and to newly fit up a large number of post offices, to which it designed to transfer the business of telegraph offices, and a large number of offices in towns, to which it proposed for the first time to bring the telegraph business.

The work had to be done both in town and country partly by the Office of Works, for whom Mr. Williams, an assistant surveyor of that department, acted ; and partly by the Post Office through its own officers.

In London Mr. Williams, besides entirely remodelling the central station in Telegraph Street (a work of great labour, which will be described hereafter) had to fit up or re-arrange for telegraphic business the district post offices, and the branch postal telegraph offices at Leadenhall Street, Fenchurch Street, Cornhill, Gresham House, St. Martin's-le-Grand, Finsbury Square, Smithfield Market, Holborn Viaduct, West Strand, Covent Garden Market, Somerset House, Temple Bar, Mark Lane, Piccadilly Circus, St. James' Street, Parliament Street, and the Borough.

The following statement describes some of the work done by Mr. Williams at those towns in the country in which the post offices are the property of the Crown :—

STATEMENT of WORK DONE in GREAT BRITAIN by MR. WILLIAMS, ASSISTANT SURVEYOR of the OFFICE OF WORKS, in FITTING UP CROWN OFFICES for TELEGRAPHIC BUSINESS.

ENGLAND.

BATH	- - -	Extensive alterations made in the Head Post Office, new room for the telegraph apparatus formed within the sorting office, and improved accommodation given in public counter room.
BIRKENHEAD	- -	Room fitted up with instrument counters, and provision made in public office for writing telegrams.
BIRMINGHAM	- -	A large new room built on girders in the money order office at Cannon Street ; the room fitted up with instrument counters. Certain alterations made at Head Post Office, and pneumatic tube carried into public counter.
BRADFORD	- -	A spare room fitted up for telegraph business.
(Yorkshire.)		

BRIGHTON	-	-	Head Post Office, writing accommodation provided by an alteration of the public counter, and some other changes made in the internal fittings. Head Telegraph Office and West Pier Office re-arranged.
BRISTOL	-	-	A new room with approaches built over part of sorting office; some additional fittings provided at the three district offices.
CAMBRIDGE	-	-	Counter accommodation re-arranged, and inner room fitted for the telegraph apparatus.
CANTERBURY	-	-	Provision made in sorting office for telegraph apparatus.
CARDIFF	-	-	Principal telegraph office re-arranged, three rooms thrown into one, and counters provided for telegraph apparatus. Public office re-arranged and fitted in improved manner; some fittings provided at Head Post Office.
CARLISLE	-	-	Postmaster's room fitted up for telegraph apparatus.
DOVER	-	-	Office prepared for the reception of the telegraph apparatus, and counter accommodation provided for the writers of telegrams.
EXETER	-	-	A large down-stairs room fitted up with instrument counters for temporary use as a signals' room.
HASTINGS	-	-	Room fitted up with instrument counters.
HEREFORD	-	-	Considerable changes made in the internal arrangements of this office. Postmaster's apartments adapted for the reception of the apparatus. Public accommodation provided.
IPSWICH	-	-	Post Office adapted for telegraph business. New staircase provided to connect instrument room with public counter.
LEAMINGTON	-	-	Post office adapted for telegraph business.
LEEDS	-	-	A new room built, and by the removal of walls between it and another room a large instrument room provided. A variety of other changes made to provide for the requirements of offices displaced by the changed battery accommodation provided in basement.
LEICESTER	-	-	Office fitted up for reception of telegraph apparatus.
LIVERPOOL	-	-	Most extensive changes made in a large upper room at the Head Post Office; the room fitted with instrument counters. Basement prepared for two steam engines and pneumatic apparatus. Counters and other necessary fittings pierced with skylights and connected by means of pneumatic pipes with the public counter. The three District Post Offices fitted up for telegraphic business.
MANCHESTER	-	-	A spacious room of the nature of a loft converted into an excellent instrument gallery fitted up with instrument counters, ceiled, and properly lighted. Various rooms converted into mechanic shops and battery rooms. Certain fittings provided at Head Post Office.
NEWCASTLE-ON-TYNE	-	-	A large room fitted up with instrument counters, and connected by lift with the message counter.
NORWICH	-	-	Post Office prepared for reception of telegraph apparatus.
NOTTINGHAM	-	-	A new room provided and subsequently enlarged to meet the growing wants of telegraphy.
OXFORD	-	-	A stable acquired and converted into a well-lighted, warmed, and properly fitted up instrument room.
PLYMOUTH	-	-	Spare rooms fitted up for the reception of the telegraphic apparatus, and counter space provided for the use of the public.
PORTSMOUTH	-	-	Office prepared for telegraph business.
RUGBY	-	-	The interior of the office almost entirely re-arranged, to provide space for the apparatus.
SHEFFIELD	-	-	An existing telegraph office thoroughly overhauled, internal arrangements altogether changed and made suitable for postal telegraphy.
SHREWSBURY	-	-	Rooms acquired and properly fitted up for telegraph business.
SOUTHAMPTON	-	-	Certain small fittings provided at Head Post Office.
STOKE-ON-TRENT	-	-	Office adapted for reception of the telegraphic apparatus.
TAUNTON	-	-	Certain changes in the internal arrangements made, and space and fittings provided for telegraph business.
TORQUAY	-	-	Rooms fitted up for telegraph business.
WOLVERHAMPTON	-	-	Rooms fitted up for telegraph business.
WORCESTER	-	-	Rooms fitted up for telegraph business.

SCOTLAND.

SCOTLAND	-	-	Changes, chiefly of the most extensive nature, planned and carried out by Mr. Williams and Mr. Matheson, were made at the following offices:—Aberdeen, Dundee, Edinburgh, Glasgow,* Greenock, Inverness, Leith, Montrose, Perth, and Stirling.
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IRELAND.

BELFAST	-	-	Under the direction of the Board of Works in Ireland a new instrument room was constructed out of some spacious lofts over the Head Post Office at Belfast.
DUBLIN AND CORK	-	-	One of the telegraph offices prepared for the concentration of the apparatus.
LIMERICK	-	-	A spare room on the ground floor fitted up for the reception of the apparatus, counter room arranged for telegraph business.

* At Glasgow two floors were thrown into one to form an instrument room, and one spacious office with open counter was provided for the public in place of two or three small offices.

I cannot speak too highly of Mr. Williams' exertions, of the readiness with which he entered into the views of the Department, or of the ability which he displayed in devising the means of providing for the work which was about to devolve on us.

It was originally intended that the surveyors in town and country should superintend the fitting up of all the less important offices, and a large number were fitted up by them. The following extracts from a circular which I addressed to them describe the plan on which it was intended that they should proceed :—

"In considering the question of accommodation at the larger offices, it will be well to bear in mind that on the transfer of the telegraphs to the Post Office the Department will acquire all the rights and obligations of the companies, so that in those large towns at which the companies own, lease, or rent offices, we shall be in a position, should that course be deemed desirable, to continue, as the companies would have continued, the occupancy of existing telegraph offices. Of course, from motives of economy, as well as for other weighty reasons, it is desirable, other considerations not prevailing, to terminate, by sale or notice, the tenancy of surplus offices; and I merely call attention to this point in order that, if any insuperable difficulty should present itself to you in immediately removing the telegraphic apparatus from the telegraph offices to a principal post office, use might be made for a time of the premises evacuated by the telegraph companies.

"In most towns, except the very largest, the wants of the telegraph office will be adequately met by one room of moderate dimensions for the use of the manipulators, which might conveniently be situated on an upper floor, and by a small room in the basement, or any other part of the building where space is not of value, wherein the electrical apparatus for supplying electricity to the signalling instruments could be deposited, and of which use might also be made as a waiting-room for messengers.

"With regard to counter space, *i.e.*, accommodation for persons writing their telegrams in the office, I may state that the telegraph companies partition off their counters into spaces from two feet to two feet three inches in width. It does not necessarily follow that at the post offices portions of the actual counter should be so appropriated; such accommodation as may be requisite might be afforded by means of desks fixed against the wall in various parts of the public office, the sole object being to afford the public the means of writing a telegram conveniently, and with a certain amount of privacy.

"In considering the question of counter work against the time when you will be called upon for a formal report, it is desirable that you should take into account the practicability of combining the duty of receiving telegrams from the public with the ordinary duty of a counter clerk, such as the registration of letters, sale of stamps, transaction of money order and savings bank business, and so forth.

"You will next have to consider the general arrangements which will be necessary in establishing the telegraph at the small money order offices conducted by traders and persons in a small way of business, and who are not called upon to reserve a separate office for the transaction of money order and general postal business. We cannot, of course, call upon the sub-postmasters to provide a separate room, yet it is absolutely necessary that the telegraph should be screened from the eye of the public. I do not doubt that it will be practicable, in almost every case, for the sub-postmaster to partition off a portion of his counter, or his shop, as an enclosure for the telegraphic apparatus. A single instrument, or even two instruments (and it is not likely that at the class of offices in question more than two instruments will be required) will not occupy a space more than two or three feet square, so that it will be seen that the accommodation to be reserved need not encroach very much on the shop room.

"As a result of common observation, I need not mention that it appears to be the general practice in every shop, great or small, to set apart a few feet of the counter as a book-keeper's desk, or, at shops where a post office is established, as a place for the transaction of money order and savings bank business. These reserved places, somewhat more screened would, no doubt, cheaply afford all the accommodation we should require."

To assist them in their task they were supplied with small models of two kinds of country post offices arranged on what was thought to be a suitable plan, and with the following blank forms of specification, and the accompanying diagrams of office fittings. For their further guidance, and for the guidance of the persons whom they might employ, specimen sets of fittings were made in London, and supplied to two or three towns in each surveyor's district :—

As time wore on, however, it was discovered that the surveyors could hardly get through the whole amount of work in the required time, and that a general fitting up of offices, within a certain distance of London, from London itself would be at once more expeditious and more economical.

Mr. Chambre undertook and carried out the organisation of a corps, to which we gave the name of the Fourgon corps, and which worked thus :—

A Fourgon, hired from one of the London mail contractors, drawn by a pair of horses, filled with fittings of the prescribed patterns (some in mahogany, for the better class of offices, and some in stained wood, for the less important offices), and accompanied by a driver, a clerk in charge, and a carpenter, provided with the necessary tools, was dispatched from London to fit up the offices in a given district. Care was taken in selecting the clerks in charge to choose men who had a knowledge of drawing and of mechanics, and who were moreover of good address and conciliatory manner, and thus able to overcome any little difficulties which the postmasters might be disposed to raise.

Messrs. Cooke, Ardron, Haines, Hasdell, Drake, Munro, and Avent were selected for this purpose; and at the outset of the work Mr. Chambre accompanied each clerk in charge for one or two days on his first trip, and instructed him in the work. The following statement shows what they did, what it cost, and how long they were about it :—

TABLE showing GENERAL RESULTS of fitting up Minor Postal Telegraph Offices by means of the "FOURGON CORPS" SYSTEM.

The first Fourgon started 28th October 1869, and the last Fourgon finished 24th December 1869.—Total time occupied, 58 days.

PROVINCIAL POSTAL DISTRICT.	NO. OF OFFICES FITTED.				Total.	NO. OF DAYS OCCUPIED.				MILEAGE RUN OVER BY FOURGON.					
	By Fourgon No. 1.	By Fourgon No. 2.	By Fourgon No. 3.	By Fourgon No. 4.		By Fourgon No. 1.	By Fourgon No. 2.	By Fourgon No. 3.	By Fourgon No. 4.	In the Aggregate.	By No. 1.	By No. 2.	By No. 3.	By No. 4.	In the Aggregate.
SOUTH-EASTERN (3 Fourgons)	35	43	42	—	120	14	12	12	—	38	270	255	270	—	795
SOUTH-WESTERN (3 Fourgons)	26	31	46	—	103	9	10	17	—	36	164	140	330	—	634
EASTERN (4 Fourgons)	26	31	46	46	149	10	14	22	23	69	163	243	373	380	1,159
SOUTH MIDLAND (1 Fourgon)	28	—	—	—	28	11	—	—	—	11	233	—	—	—	233
DERBY (2 Fourgons)	55	58	—	—	113	22	17	—	—	39	271	296	—	—	567

(continued.)

PROVINCIAL POSTAL DISTRICT.	COST OF FOURGONS AND STAFF.					COST OF FITTINGS USED.					AVERAGE COST OF FITTINGS PER OFFICER.				
	No. 1.	No. 2.	No. 3.	No. 4.	In the Aggregate.	Route No. 1.	Route No. 2.	Route No. 3.	Route No. 4.	In the Aggregate.	Route No. 1.	Route No. 2.	Route No. 3.	Route No. 4.	Per District.
SOUTH-EASTERN (3 Fourgons)	£ s. d. 30 13 5	£ s. d. 36 15 8	£ s. d. 34 11 5	£ s. d. —	£ s. d. 102 0 6	£ s. d. 31 9 4	£ s. d. 32 12 10	£ s. d. 39 10 3	£ s. d. —	£ s. d. 103 12 5	£ s. d. 2 1 2	£ s. d. 1 12 3	£ s. d. 1 15 3	£ s. d. —	£ s. d. 1 14 3
SOUTH-WESTERN (3 Fourgons)	£ s. d. 27 13 0	£ s. d. 31 17 11	£ s. d. 56 19 4	£ s. d. —	£ s. d. 116 10 3	£ s. d. 16 12 6	£ s. d. 30 16 9	£ s. d. 37 0 7	£ s. d. —	£ s. d. 84 9 10	£ s. d. 1 14 0	£ s. d. 2 0 5	£ s. d. 2 0 10	£ s. d. —	£ s. d. 1 19 0
EASTERN (4 Fourgons)	£ s. d. 30 0 3	£ s. d. 39 11 7	£ s. d. 71 3 4	£ s. d. 71 15 2	£ s. d. 212 10 4	£ s. d. 16 8 6	£ s. d. 24 7 0	£ s. d. 37 11 5	£ s. d. 32 19 0	£ s. d. 111 5 11	£ s. d. 1 15 8	£ s. d. 2 1 2	£ s. d. 2 9 0	£ s. d. 2 5 6	£ s. d. 2 3 6
SOUTH MIDLAND (1 Fourgon)	£ s. d. 30 18 6	£ s. d. —	£ s. d. —	£ s. d. —	£ s. d. 30 18 6	£ s. d. 29 10 8	£ s. d. —	£ s. d. —	£ s. d. —	£ s. d. 29 10 8	£ s. d. 2 3 2	£ s. d. —	£ s. d. —	£ s. d. —	£ s. d. 2 3 2
DERBY (2 Fourgons)	£ s. d. 73 3 0	£ s. d. 65 16 1	£ s. d. —	£ s. d. —	£ s. d. 138 19 1	£ s. d. 43 8 10	£ s. d. 26 8 9	£ s. d. —	£ s. d. —	£ s. d. 69 17 7	£ s. d. 2 2 4	£ s. d. 1 11 9	£ s. d. —	£ s. d. —	£ s. d. 1 16 11

GRAND TOTALS.

No. of Provincial Postal Districts visited	-	-	-	5
" Fourgon Corps employed	-	-	-	13
" offices fitted up	-	-	-	513
" days occupied	-	-	-	193
Mileage run over by Fourgons	-	-	-	3,388

Cost of Fourgon Corps and fittings	-	-	-	£ s. d. 999 15 1
General average cost on total No. of offices fitted	-	-	-	1 18 11

NOTES.—Each "Fourgon Corps" consisted of one officer in charge, one carpenter, and a van drawn by a pair of horses; costing, respectively, 15s., 7s., and 30s. per diem. The van being paid for at seven days a week.

The fittings with which each van was laden were of two classes; the best of mahogany, and those more generally used of stained deal.

In some cases, the average cost was increased by the addition of railway conveyance from and to London and some point in the district for the van and horses and the Corps in charge; in other cases, the average was affected by the necessity of using the more expensive class of fittings, i.e., mahogany. Another cause of difference, telling adversely against a continued low average, was the bad weather experienced in the later trips, the season being then somewhat far advanced.

In addition to the above, 377 offices in Mr. Stow's Districts of London, and 19 offices in the London District under the control of Mr. Boucher, were fitted up upon the same principle.

ALAN E. CHAMBERE.

Circumstances have caused me to visit, in the course of the past year, many of the offices which were thus fitted up, and I can state confidently that the work was uniformly done in a highly creditable manner. Some of it has not yet borne fruit, as the wires have not yet been extended to all the offices which they visited, but the whole will in due time be useful.

From time to time as the principal post offices were fitted for telegraph business, and as the engineers were ready to lead the wires into them, one or other of the telegraph companies having an office in the neighbourhood of a post office which was ready was requested to move its staff and instruments into that office, and to carry on business there on its own account until the Postmaster-General was ready to assume the control of the work.

Thus the United Kingdom Company moved into the post office at Leeds, the Electric Company into the post office at Leicester, and the Magnetic Company into the post office at Greenock some weeks before the actual transfer of business took place. In this way a large part of the shifting of staff and instruments was effected gradually long before the final transfer took place.

There were, however, a great many cases in which no such gradual transfer could take place. The Electric Company had a large number of offices at railway stations, which were served by wires used jointly for commercial and railway purposes, and worked by clerks who worked both for the railway and the telegraph company. In these cases the transfer could not be effected until the railway company had been provided both with wires and clerks in substitution for what they were going to lose. In spite, however, of these obstacles a large part of the shifting was gradually effected.

(c.) TRAINING AND REDISTRIBUTION OF STAFF.

Our difficulties in regard to staff were very great indeed. In the first place we had to take over a large number of clerks who were not all alike familiar with one and the same form of instrument. Some could work the Bright's bell instrument, but not the single needle or printing instrument; some could work the single needle only; some again could work the printer and the single needle, but not the Bright's bell instrument. We were desirous of extending the use of the bell and the printer, and soon found ourselves in urgent need of more clerks who could work either or both of those instruments. Again we had reckoned upon the services of a large number of clerks who were employed at railway stations, partly for railway and partly for commercial purposes. We could not have removed these clerks from the railway stations before the railway companies had obtained substitutes for them without endangering the public safety.

Very large districts of country were thus situated. In the south-east of England especially there were no town telegraph offices. Even such a town as Maidstone was served from a railway station situated on the opposite side of the river to the town.

It was absolutely necessary, therefore, to organise a scheme of instruction in the use of telegraph instruments, and for this purpose plain instructions for the use of learners were drawn up, and large quantities of dummy instruments of various kinds were provided. A competent force of trained clerks, to act as instructors, was borrowed from the telegraph companies, and a district was allotted to each instructor, over which he was required to travel constantly, so that in passing from office to office he might assist and guide the learners, and note and report their progress from day to day.

That there might be no lack of learners, a bonus of 1*l.* was promised to any postmaster, sub-postmaster, or receiver, or to any member of their families, or to any clerk or sorter or letter carrier who could to the satisfaction of an examiner display a certain proficiency in the manipulation of telegraph instruments. The following statement, which is made up to the end of the year 1870, will show the success with which our efforts in this direction have been attended in Great Britain.

RETURN showing the Number of "Post Office" Learners to whom the Postmaster-General's bonus of 1*l*. has been awarded.

Trained in	No. of Learners.		Nature of Proficiency attained.				Total Number.
	Male.	Female.	Two or more Instruments.	On the Single Needle.	On the "Morse."	On the Bell.	
London - -	139	196	—	335	—	—	335
The Provinces -	743	419	40	932	166	24	1,162
Scotland - -	114	93	3	140	58	6	207
Total -	996	708	43	1,407	224	30	1,704

"By the term 'Post Office Learners' is meant persons already in the service of the Post Office, their friends or relatives, and persons who have been induced to learn partly by the promise of the bonus, and partly by the hope of future employment. These learners are not to be confounded with those presently to be mentioned in the return of the London school, who form an entirely distinct and separate class, composed of persons specially trained for *direct* appointments, and not entitled to the bonus. A special interest attaches to the class of 'Post Office' learners, as showing how correctly the Department had reckoned on the co-operation of its employes throughout the country in carrying out the great scheme of postal telegraphy.

"From a return which has been called for, and which is kept up as new learners are added to the list, it has been found that fully *ninety-seven per cent.* of the learners trained at provincial and Scottish offices are actually in the service of the Department, many of them in entire charge of postal telegraph offices, and all of them engaged in some way or other in telegraph duties. In London the learners are almost exclusively composed of receivers, their wives, sons, daughters, and assistants; and it may safely be assumed that even a larger per-centage of these is engaged at the present moment in telegraph work than in the country, large as it has been proved to be there. Taking these numbers in conjunction with those afforded by the returns of the London school, we have the impressive fact that the Department has, in little more than twelve months, added to the effective strength of the telegraph force of the country no fewer than 2,000 persons who knew nothing whatever of telegraphy prior to the transfer."

But useful as this scheme of instruction proved, it soon became evident that even more vigorous and systematic measures were necessary, and we determined to establish regular schools of instruction in London and many other large towns. The following statement will show the nature and result of our plans.

LONDON.

There are male and female schools, fitted up with every necessary appliance for teaching, and capable of accommodating from 100 to 150 learners. The female school has been in existence since November 1869, and the male school since February 1870. During this period there have—

Entered the male school - - -	204 learners, &c.
Do. female do. - - -	367 „
Making a total of - - -	571 „

who have been disposed of as follows :—

	Males.	Females.
Appointed as telegraphists - - -	154	269
Resigned - - -	26	25
Dismissed (incompetent) - - -	10	24
Now in school - - -	14	49
Total - - -	204	367

Of the total number appointed, viz., 423, there have been sent—

		Males.	Females.
To the central station, as manipulators	-	94	192
„ metropolitan district	„ -	34	51
„ country stations	„ -	25	1
„ counters, or as sorters, &c.	-	1	25
Total	-	154	269

It has been found that the average time occupied in training a male learner is as nearly as possible two months, and a female, three months; and so far from there being any difficulty in procuring learners, there is usually a superabundance of applications from persons of both sexes. All the systems of telegraphy in use by the Department are taught in the school, including the art of “punching” for the Wheatstone transmitter, and proficiency in each of the three systems—Morse, single needle, and bell—must be shown before a learner is certified as competent. No pay is given during the period of instruction, nor are learners taught in these schools entitled to the bonus usually paid to “Post Office” learners in the strict sense. But when proficiency has been shown in each of the three systems before mentioned, combined with a fair knowledge of the technicalities of telegraph work, and of the “H” set of instructions, the learner becomes entitled to go to a district office as a “probationer,” and commences to receive pay of 10s. a week if a male, and 8s. a week if a female. Afterwards he or she is either appointed to the central station, or to a district office, according as there may be a vacancy.

So well have these schools answered their purpose, that the London offices have already been placed on a tolerably efficient footing, so far, at least, as numbers are concerned, while many pressing cases in the country have been met by their means.

It is not, of course, pretended that competent telegraphists, in the strict sense of the term, have been sent out of these schools, for it is well known that telegraph clerks cannot be *made* in this way. But a class of operators has been produced, who have proved, at least, that the basis of a good sound telegraphic education can be laid in this way.

It only remains to add that the London school is conducted by a superintendent, with one principal, and two second assistants in the male department, and with a matron and six assistants in the female department. A copy of the rules, which have also been adopted in the Edinburgh school, is annexed.

EDINBURGH.

The school here is modelled on much the same plan, and is capable of imparting instruction to 30 learners at a time.

MANCHESTER.

There has been a school here for nearly nine months, and the accommodation provided is for 20 learners.

LIVERPOOL

Has had a school for nearly 11 months.

BIRMINGHAM

Has had a school ever since the transfer, with an interval of a few weeks.

NEWCASTLE

Has had a school, which produced nine competent learners in six months, but which has since been discontinued for want of space.

GLASGOW

Has had a school for about six months.

IRELAND.

The schools in Ireland underwent a complete re-organisation in July last, and are now in a very flourishing condition. In Dublin, in addition to the departmental school in College Green, which has produced 20 trained learners, and at which the average number under instruction is 18, learners are trained for the Department at the Queen's Institute, under an arrangement which subsisted, prior to the transfer, between the Committee and the late Magnetic Company. We have improved upon this arrangement, however, and Mr. Cornwall reports on the 13th of October, that not only has the change resulted in greater satisfaction to the Committee, but that it has greatly stimulated their efforts to make an adequate return, as well by increasing the number of pupils under instruction as by improving the quality of the instruction imparted.

Under improved arrangements as to space, &c. the number of persons in training has been increased from 24 to 40; and it is considered probable that from this number 12 qualified learners per month may be drafted into the service, if necessary. Already 35 trained female clerks have been obtained through the agency of the Institute; and there has been observed this noticeable feature, that the clerks obtained in this way, *since the transfer*, have exhibited a higher educational proficiency than many of their predecessors.

The regulations in force in the Institute, as well as in the departmental school, are identical with those of the London school.

Belfast has a school, from which 12 certificated learners have been drawn for service in the Department. The average number of persons under instruction is 10, but efforts are being made to increase the number to 25 or 30.

Cork has an average of nine learners under instruction, but as yet only two learners have obtained certificates of proficiency. This school was the last one established in Ireland; and it appears that failure to pass the educational test on the part of numerous candidates has somewhat interfered with its productive power.

The following are the regulations which have hitherto been enforced with regard to the London school:—

RULES OF THE SCHOOL OF TELEGRAPHY.

Admission of Candidates.

1. The limits of age are from 14 to 20, and candidates under the former or over the latter limit are ineligible.

2. Nominations to learnerships are made by the Postmaster-General; and admission to the school is dependent upon the result of an examination in the following subjects, viz.:—

- (1.) Writing from dictation,
- (2.) Exercise to test handwriting,
- (3.) Arithmetic—first four rules, simple and compound.

3. No pay will be given during instruction; but when the candidate has attained the standard of efficiency required for telegraphists employment will be offered as vacancies occur.

General Rules.

1. The hours during which the school is open for instruction are from A.M. to P.M., and the order of attendance is as follows:—

- (1.) For male learners, from to .
- (2.) For female learners, from to .

Punctual attendance will be rigidly enforced, and general regularity in this respect will be duly estimated in deciding upon the fitness of the learner for employment in the Postal Telegraph Service.

2. Each learner on entering will be furnished with the following papers for his guidance and instruction:—

- (1.) Full set of instructions "H" (organization of staff).
- (2.) Alphabet and punctuation card,
- (3.) Clock card,

and to such of the learners as display a special aptitude for "engineering" work, a copy of Mr. Culley's "Handbook of Practical Telegraphy," together with a set of instrument diagrams, will be lent.

3. The school will be conducted in all respects as a "model telegraph office," and the learners will be required to subject themselves on all occasions to the discipline of the Postal Telegraph Service, as enforced by the superintendent instructor in charge.

Talking will not, under any circumstances, be permitted amongst the learners; indeed, there will be no necessity for this, as every learner will be provided, as far as possible, with an actual telegraph instrument joined up to some other instrument, and in the hands of another learner, so that each may "speak" to the other without the use of the voice.

4. The course of instruction, after the elementary stages have been passed, will embrace every kind of work connected with an ordinary telegraph office, *i.e.* imaginary messages will be sent from one

instrument to another, with all the formality of real messages, slips of news, already printed off by the instructors, will be wound on drums, for the purpose of being read off and transcribed by the learners; and at the close of the day the copies will be brought together and carefully examined, so as to detect any errors in the transcription, timing, dating, or general filling up of any message or slip of news.

5. The standard of efficiency will only be reached when a learner is able to read 12 and send 20 words per minute on each of the three instruments in use by the Department, viz., the printing, the single needle, and the bell, in addition to which will be required a fair knowledge of the contents of the "H" set of instructions, and of the general routine of a telegraph office.

6. Learners will only be entitled to the benefits of the school for two months after their date of entering. If, at the expiration of that period, they are not pronounced competent, it will be a question for the Secretary's decision whether they shall continue to receive instruction.

7. The superintendent instructor will keep a record of the attendance, progress, and examination of each learner, and he will furnish certificates in cases of proficiency on the form which has been supplied for that purpose.

8. Strangers will not be permitted to inspect the school of telegraphy, unless by special authority from the Secretary; and persons applying for admission to the school *as learners* should, when eligible, as far as age, &c. is concerned, be requested to make application to the Private Secretary to the Postmaster-General.

By a systematic and persistent training of learners, by borrowing clerks from railway companies wherever it was possible to borrow, by bringing back to the work clerks who had left the service of the telegraph companies for other occupations, and especially by bringing back female clerks who had married, and who in accordance with the practice of the telegraph companies had been dismissed on their marriage, the Department has contrived to acquire the necessary amount of staff. How great its needs have been will appear from the following comparative statement of the staff employed by it, and the staff employed by the telegraph companies. Reference will hereafter be made to the messenger force.

STATEMENT showing the NUMBER of CLERKS and ASSISTANTS employed by the POST OFFICE for TELEGRAPH WORK on the 31st August 1870, and the NUMBER of CLERKS employed by the TELEGRAPH COMPANIES prior to the "TRANSFER."

POST OFFICE, 31st August 1870.

—	Clerks and Assistants employed on Telegraph Work.				
	Clerks of the Department.		Assistants employed by the Postmasters.		Total Number of Male and Female Clerks and Assistants.
	Males.	Females.	Males.	Females.	
ENGLAND - - - - - (excluding LONDON.)	1,610	48	452	457	2,567
SCOTLAND - - - - -	291	14	104	66	475
IRELAND - - - - -	255	84	60	7	406
LONDON - - - - -	482	728	124	131	1,465
	*2,638	874	740	661	†4,913

* 9 men of the Royal Engineers are included in this number.

† 768 Postmasters' assistants, only partially employed on telegraph duties, are included in this number.

TELEGRAPH COMPANIES prior to the "TRANSFER."

—	Clerks.		
	Males.	Females.	Total.
UNITED KINGDOM - - -	2,035	479	2,514

SCHOOLS FOR TECHNICAL INSTRUCTION.

Although, as I have stated, we have been able by the instrumentality of our schools to obtain a considerable force of tolerably well skilled manipulators, we have for some time been anxious to carry the instruction both of new intrants and of persons now in the service somewhat further. Four or five months ago Mr. Culley proposed that a school should be established for the purpose of giving to the staff of manipulators a knowledge of the principles, construction, management, and adjustment of instruments, and such an acquaintance with electrical science generally, as will enable them in ordinary emergencies to be themselves the engineers for their respective circuits or stations. Mr. Culley's object is as much as possible to break down the hard and fast line which now separates the commercial from the engineering staff, and in too many cases makes the former helpless when the latter are absent. I believe that Mr. Culley held this view when he was an officer of the Electric company, but it is of far more importance now than then that his view should be acted upon. Year by year as the Post Office widens and embraces an ever-increasing number of small stations, and an ever-increasing apparatus at large stations, the demands on the time of the engineering staff will increase and it will be desirable on all grounds that whenever such an arrangement is practicable the commercial staff shall be made able to supplement, to some extent, the labours of the engineering staff, so as to leave the latter staff more free to attend to stations at which no such convertibility of staff can be effected. At the small stations, which are for the most part very distant from the engineering depôts, it is especially desirable that the clerks or assistants should have such an amount of technical knowledge as would enable them to detect and remove small faults in or in the neighbourhood of their own offices. Both time and money would be saved in numberless cases if the persons employed at small and remote offices possessed this knowledge. Mr. Culley, in a memorandum which he prepared for me in November last, stated his proposition in the following terms:—

"My proposal with regard to the engineering schools will be this.

"That the whole signalling staff be given to understand the Department expects they shall be able to detect and remedy the more ordinary faults, and that it is part of their duty to keep their apparatus in proper order.

"That no new clerk should be appointed who could not pass an examination.

"That the female staff should be expected to understand instrument adjustment only.

"That at each of the schools for signallers an assortment of the various apparatus should be provided, but it would not be necessary to include the 'Hughes' or the 'Automatic,' except at some of the schools.

"The chief instructor of each school should be qualified to undertake the duty of instruction as regards apparatus. His object should be to give his pupils an idea of principles and to explain to them the reason why a certain course is adopted, so that they may not only be able to understand one special form of any instrument, but also any modification which may happen to be before them.

"For this reason I would propose that not only the standard form of instrument be supplied, but also some of the older forms, such as,—

"Drop handle needles.

"Embossing Morses.

"Varley's relays.

"Soft iron relays.

"Peg and lever switches.

"It would also be desirable to construct a model line.

"The examination might be conducted in this way: The instructor to cause a fault, either on the line or on the instrument, in the absence of the pupils, and to require them to discover and remedy it. This is the plan pursued by Professor Hughes.

"It might be well also, in order to give a little interest to the instruction, to provide some of the simple electric experimental apparatus.

"I think lectures might be given occasionally to the more promising pupils, but this would be an after consideration. I think Mr. Sanger has started a school, somewhat on this plan, under Mr. Louth.

"The printed statements which have been issued have led me to suppose that a sufficient number of pupils offer themselves to enable the Department to reject those who cannot pass this examination, the strictness of which must be determined by trial.

"With reference to the existing staff, I don't think the staff will take the trouble to learn unless they benefit themselves in pay; and it will clearly be impossible to urge them by a threat of dismissal. I would propose then that a gratuity might be given to those who qualify themselves, or better still, that a small addition be made to their salary. This addition should be kept entirely distinct from advance by ordinary promotion, for promotion will always in practice be given for reasons totally disconnected from proficiency in this respect.

"This extra pay should be rescinded in case the receiver fail to keep up with the terms, or if he fall back in his qualification.

"Three classes might be instituted,—

"The lowest, those who can detect a faulty battery cell, and who, in addition to this, can adjust an ordinary bell or "Morse."

"The second, those who can localize a line fault and test for resistance as well as understand simple apparatus.

"The first, those who also understand the higher class of instruments, such as transmitting relays, the "Hughes," and the "Automatic."

"The higher engineering duty of the station should be performed by the clerk in charge and his assistants.

"I do not think any special machinery will be required for enabling the existing staff to qualify for the lowest grade, except at the smaller stations, and there they must be taught by a travelling instructor.

"Every clerk at a large station has the opportunity of learning if he pleases all the simpler matters, and in fact those who care to take the trouble do learn.

"Special teaching would be required for the two higher grades. I would propose that one or more of the most competent of the station staff should be paid to lecture and give instruction. This at large stations only.

"The clerks would readily attend such classes if they were paid for their time, even without the extra bonus; but if they were not paid very few would keep up their attendance if it were not for the hope of earning the proposed extra pay, but I think this might prove a sufficient inducement.

"Mr. Eaton has instituted a weekly meeting of his own staff, where papers are read and electric matters discussed. I would propose that such meetings should be officially recognised, and that works and periodicals bearing on electric matters should be supplied."

At the general meeting to which I have so often referred, Mr. Culley's proposals were very fully discussed. The report of the discussion will be found in the printed report of the proceedings, but for convenience of reference I give here some extracts from the report, which will show plainly the great importance of the subject, and the views which the engineers of the Department take of it.

With Mr. Culley's entire concurrence I called the attention of the meeting to the fact that the clerks of the late United Kingdom Company, who during the hard struggle of that company for existence were compelled to turn their attention to each and every duty of their offices, were much more handy and much better able to deal with emergencies and to remove faults than the clerks of the wealthier companies who were in the habit of relying very much upon the engineers; and I asked Mr. Shaw, formerly superintendent of the United Kingdom Company, to state his views. He said:—

"With the United Kingdom Company it was, as you say, sir, simply a struggle for life. We started a system that none of our clerks really understood, and we had to get inferior clerks from the other companies, and we had to train them from almost the very lowest point that you could train a clerk. I may say that in Manchester, where we first started, I found it necessary myself to establish a school, or schools, so far as this, that every clerk had to be put under a system of instruction, not only of manipulating but of regulating. We started with very bad wires, and we had to use relays, which required a certain amount of training, and the company were not in a position to pay very high salaries, and consequently we got somewhat unskilled clerks. Our system was to take them into the office and put them to the instrument, and to show them the simple arrangements for regulating, and in a very short time we found that they were able to manage their instrument and to regulate it, and afterwards to obtain a knowledge of the batteries; but, as I said before, we were obliged to have a small staff, and we had to make the clerks in charge their own engineers. It became a standing rule with me, as the superintendent of the company, that every clerk in charge at a small station should not only be able to regulate his instrument, but that he should be able to make up a battery, and maintain a battery, and to detect a fault in the instrument, and, if a simple one, to repair it. The only way in which we could do this with the higher class of instruments which we afterwards used was by giving them some five or six weeks' instruction in the use of the instrument, which I may say was Professor Hughes's. Professor Hughes came over to England and gave us three months of instruction."

As Mr. Eaton had voluntarily started a discussion class at the central station in Telegraph Street, I requested him to describe the course which he had taken. He said:—

"The transfer of the telegraphs to the Government brought together at the central station on the engineering staff members of each company, each one knowing the system to which he had been accustomed, but comparatively ignorant of the others. Fortunately for myself, I had previously had the work of concentrating the various systems into Telegraph Street, and from the experience gained in carrying this out I had acquired a general knowledge of the systems of the Magnetic and United Kingdom Companies that was not enjoyed by any other of Mr. Culley's staff. This, added to my previous knowledge of the Electric and International Telegraph Company's system, enabled me to fall into the altered state of things more readily than those who only saw the things together on the first day of the transfer for the first time. I, of course, do not include here those of Mr. Culley's staff who had prepared the plans and knew what lines were in existence, but I refer to those only who had the working of them. The result was that for some time, although we were in the same building, we were to a certain extent divided. After a time this state of things gradually wore off, and by an enforced interchange of duties between the members of the various companies, between clerks who knew one set of lines and those who knew another set of lines, we gradually amalgamated and brought them acquainted with the system as a whole. To make this more complete, an idea of a class meeting was started; this was taken up eagerly, and has been continued to the present time. It has been, to the present, quite independent of the ordinary duties. Members attend in their own time, and have instituted a fund for

the purchase of current literature strictly bearing upon science, and which is calculated to improve them in the knowledge of the various forms of instruments, &c. Papers are prepared and read by the members in turn, illustrated by diagrams, and these are discussed at the meetings. I can safely say that those who have attended have, by this interchange of ideas, been much gratified, and have also been benefited. The membership has up to the present been confined to those of my staff at the central station, and number about 16. The meetings have been held in my office, and I have at the general request presided. I have no doubt that many of the commercial staff would be glad to join, if allowed, but the difficulty would be that most of the present members have a fair knowledge of the subjects not generally enjoyed by the others. Therefore it would not work well. What is wanted is a school where a properly qualified instructor might take all who were appointed to attend, and teach them on a fixed plan. Some of the subjects at our class are confined more to the special duties of the central station, that would not be of much service to those who were not to be stationed here, although at the same time it would be of advantage if those who worked with us at certain stations could be brought together so that an uniform system might in time be in existence everywhere."

In order that all those who were present at the meeting might clearly understand what kind of instruction it was that the engineers desired to impart, I requested Mr. Graves to state his opinion, which he did in the following words:—

"I think there is a certain amount of misapprehension existing as to what is implied by the engineering training which the officers of the engineers' department think should be imparted to the *employés* of the service generally. The words 'scientific instruction' have been vaguely and freely used by myself, for example, but I am quite sure that the phrase is very *mal apropos* to the subject in hand. Science is not the present object. We wish to leaven the entire mass of the clerks employed by the Department with such primary technical knowledge as is necessary to enable them to keep the apparatus which they control in fair working condition. A clerk at present entering the Department is trained in manipulation only; that is, he knows how to make the signals to express the letters, and if he has any supplemental instruction it is merely in codes, in matters connected with filling up the forms, and it in no way aids him in keeping in order the instruments by means of which he has to transmit his communications. It is this further education which it is thought most desirable to impart. It is quite evident that there are many small post offices in which a single clerk, far from any engineering officer, will have entrusted to him one, two, or more instruments, which he cannot work unless they are in an efficient condition, and it is also self evident that a very simple accident, arising from an immediately remediable cause, will often paralyze entirely the working of the office. For example, the battery is attached to the instrument by connecting wires; one of these becomes detached from the terminal or the screw by which it is connected with the instrument; the result is that the clerk can transmit no signals; if he is wholly unacquainted with the nature of the instrument he uses his work is stopped and his office is closed for an indefinite period, till a member of the maintenance staff can reach it and remedy the defect. Mr. Culley proposes that a system of engineering training should be adopted, divided into three grades, the lowest, or primary, being one which it is desirable should be attained to by every *employé* of the service, by every clerk, whether admitted in the future, or whether now employed. Such *employé* would be asked only to acquire that subordinate, primary, or elementary knowledge which is absolutely indispensable, if he is efficiently to do the work at any particular station. That is, he must have an idea of the construction of his battery, and have an idea where to look in case of any failure of its action, and know how to remedy any simple fault. In the same way he should be acquainted with the connexions of his instrument, that is, he should have a rough idea of the course of the electric current through his instrument, and be aware to what points of it to look in the event of any failure in its action, to see where dirt is most likely to accumulate, where any particular spring or other essential portion may give way so as to paralyze the whole; and again, particularly with regard to the printing instrument, he ought to be competent to deal with the adjustment, as it is called, that is, the regulation and management of certain screws which are employed to control the instrument and keep it in efficient working order under varying conditions. This adjustment is necessary to be learned because the strength of the electric currents passing into an instrument from a distant station on a fine day and on a very wet day will vary. In the same way, an instrument speaking to two stations, one close to it and the other a long distance away, will also be influenced in different degrees, and the adjustment is to neutralize that. And to enable an office or station to be kept working under conditions that involve the necessity of local alteration, this primary education which may fairly be termed technical education, should be imparted, if possible, to every clerk in the service. Following upon this, Mr. Culley suggests a secondary grade, in which clerks should not merely possess all the knowledge required in the primary grade, but should also have a knowledge of the means requisite to discover the probable position of defects or interruptions of communication on a line, to localize faults, as it is technically termed, and should be enabled by means of proper testing apparatus, to ascertain from time to time the condition of the wires passing from their office. Beyond this again, comes a third and higher class, and that is really the only one to which the name 'scientific instruction' can be properly applied. This higher class must acquaint itself with the more complex apparatus employed by the Department—with the Hughes' type-printing instrument, with the Wheatstone fast speed instrument, and with those descriptions of instrument which can only be employed at stations of considerable importance, and which from its nature involves mechanical complexity. Add to this sundry other branches of knowledge denoting a similarly advanced stage, and you have an outline of what appears to represent the first or highest class of telegraph students. This highest class must in all cases be a very limited one; it must be composed of persons who have shown a strong personal inclination for a study of the subject and whose inclinations are gratified by having opportunities given them for developing knowledge acquired for themselves. You cannot obtain efficient students of this advanced order by merely telling certain men that it is their interest to acquire the knowledge, they must feel the prompting spring within themselves. I think, therefore, this first class is one which cannot be dealt with by the establishment of any provincial or general schools; it must be dealt with by special schools, either in London, or as

Mr. Preece would perhaps suggest, in Southampton, for there are special reasons why at Southampton education of an advanced order can be given with facility and efficiency; but leaving that alone for the moment, my idea is, that the instructors who are employed at the central offices to direct the manipulation study should be able to direct the study of their pupils towards the attainment of the knowledge which I have been referring to as forming the requirement of the primary grade—that technical knowledge which all ought to possess. A fear seems to be entertained that in the establishment of district schools too large a number of learners will be trained at the same time, and that more young hands will be taken on than there will be situations found for in a reasonable period. As that seems to be considered a likely danger I may remark that the instructors who would be placed at such central offices will not merely have to deal with the learners who may be admitted for the future requirements of the Department, but they will deal with the members of the existing staff who are ignorant of the knowledge which it is so essential they should acquire. Nine-tenths or nineteen-twentieths of the existing clerks of the Department are wholly ignorant of that which it is essential they should know, if they are ever to be efficient servants of the Department, and I believe the instructors of those central schools would for a long time be amply occupied in imparting knowledge to the men on the lists now, quite independent of that which they would have to give to the pupils who entered for the future. The clerks in charge at subordinate stations (I mean those stations where no school existed, but where it would be possible to take on a few learners) would be able to impart similar knowledge in technical matters to pupils placed under their direction. At the most subordinate of all stations where the post-master has a single learner, I quite admit you cannot give even the simplest technical education without bringing the learner to some centre, or sending an instructor to him. Passing over that difficulty, it is clear that, without trenching in any way upon the schools that are necessary for manipulating purposes, without adding to the cost that the manipulating schools must necessarily carry with them, you obtain this technical education in addition to that hitherto sought for. The technical education should, in my view, be imparted by the instructor, but the instructor's certificate should not be considered as a sufficient warrant that the education had been imparted to a sufficient degree; let the instructor instruct his pupils and send them up for examination, but let an officer detailed by the divisional engineer, or a proper person having acquaintance with the subject, examine, pass, and certify the clerks.

"Then there are the central schools for the more advanced grades—perhaps that had better be left in the hands of Mr. Culley or Mr. Preece, but I would say one word as to the instructors. I am personally wholly ignorant of the calibre and capacity of the instructors of the schools as they are now arranged, and I have not the remotest conception whether the instructors at Birmingham or Liverpool or Manchester are able to do more than impart manipulative knowledge to their pupils—if they are not they ought to be—if they do not possess the knowledge they must be trained—we must teach the instructor, or if he is unteachable he must be changed for one who has been taught, or can be taught; there is quite a deficiency of efficient hands in the service on whom drafts could be made to form an instructing force. The number of hands absorbed wholly for instruction would be limited; a great portion of the instruction would be developed by clerks employed in the duties of the office, who in extra hours and under special arrangements could act as instructors. Let us begin by certifying the efficiency of the instructors; let us then mark out a course which every lad of average intelligence can attain to, and when we have done that and taken steps to induce the bulk of our existing service to acquire that knowledge of which they are deficient, we shall certainly raise the standard of our existing corps, we shall arrive at a higher order of education and efficiency than the learners have hitherto attained, and our staff will approximate more nearly than the staff of the former companies did, or the staff does now, to the idea of an efficient telegraph establishment. We want to approach to the ideal which we find in certain portions of the United States, where the clerk, if abandoned wholly by the engineering staff, if separated from any man whose special business it was to attend to the instruments, could patch up his instrument, put together a broken battery, and generally do all that was needful in the office and much that was needful out of the office, not altogether efficiently, but in such a way as to keep the mill going till some one could be brought in to repair the mechanism more thoroughly."

Mr. Preece said :

"Referring to Mr. Culley's report, and referring to Mr. Graves' remarks, it seems to me that a considerable amount of advantage must accrue to the Department from giving technical instruction to our force; naturally, we engineers look upon this point with a great deal more interest, perhaps, than the surveyors. I should like to point out in the first place the effects that now arise from the absence of this technical education on the part of our staff. It must be remembered that we have stations many miles away from a railway, at places which are very difficult of access, and which in the ordinary course of events it takes a very long time to reach; the consequence is that our public messages, when interruptions occur, are very considerably delayed, and the reputation of the Department is at stake.

"Now if we give these instructions which we are so desirous of giving to our clerks, we give them the power at once of rectifying these faults, thereby preventing all the causes of delay, and removing the ground for the blame which at present attaches to the Department. The rapid removal of faults is nothing, however, compared with the prevention of faults; and it is in the prevention of faults that I consider the education of our staff will lead so much to the future reputation of the Department. Again, this knowledge will also facilitate the testing and localizing of faults, enabling us perfectly to meet the wants of the public by placing all our wires in proper working condition. As regards the means of obtaining this, Mr. Culley's report and Mr. Graves' remarks deal generally with the subject; I want to point out how we can obtain what we so much desire. I say the first thing we have to do is to attack our existing staff. We have collected together by no means bad specimens of intelligence. We have, it is true, in many places, very inefficient hands, but we have them there and we must make the most of them. The first thing we can do to instil a desire amongst the staff generally, to acquire this knowledge, is to offer rewards when 'is shown any particular activity, any particular zeal, or any

particular act of intelligence, and it has been my practice to call your attention to anything of the kind that has happened, and you have invariably at once acted on my recommendation, and given small gratuities, and had it posted in the postal circular. The result has been this, that it has created a spirit of inquiry amongst all the staff. The moment the inspector appears at an out station the clerk at once asks him for information, and I believe we have set the ball rolling, and are in a fair way to perfect our plans more in accordance with Mr. Culley's ideas. We shall find that we shall be able in time to raise an army of good electricians, and when that good time comes about we shall cease to hear of those breaks and accidents which now so frequently interfere with our communication. But in addition to offering those remarks and gratuities, and inserting those notices in the postal circular, I would make a certain fixed addition to every man's pay in accordance with the abilities he shows. But those are mere matters of detail, which I will not allude to now, but which I think can very well be left for subsequent consideration. There is also another question, namely, whether the acquisition of this knowledge shall be made a part and parcel of the steps which lead to the clerk's promotion. That is a question which may very well be left to the consideration of the committee. To secure these different points, I propose, assuming that it has been determined that our staff shall be educated, to form classes at all the large towns. The nature of those classes, the manner in which the instruction should be given, and the various details, would of course be left to the committee; but I may say this, that I take a particular interest in this point, because for many years past I have had a great deal of experience in the tuition of telegraphists. The Indian Government have sent all those who have been appointed to the Indian Telegraph Department to me at Southampton, and I have every year given them a regular course of training in practical telegraphy. That has thrown upon my shoulders an immense amount of labour, and to give an idea of what it amounts to, I find last year I delivered no less than 52 lectures and 26 separate demonstrations on practical subjects. To do all this entailed the giving up of a considerable amount of time, but it has afforded me very great pleasure, and I am particularly anxious that some system of that kind should be adopted in our Department. We know that a little knowledge is a dangerous thing, but that little knowledge, when imperfect, particularly in telegraphic matters, is a most dangerous thing, and we find that the knowledge that is imparted by books and by telegraphic journals and things of that kind is of such an unsatisfactory and imperfect character that those who attempt to act on it must invariably fall into difficulties. Now the knowledge that is possessed by Mr. Culley and his officers is knowledge that has been ground into them by 20 years' experience. I speak of it perhaps a little egotistically when I say it has been cemented by the most patient industry; in fact those who have to keep up with the time and to maintain a knowledge of telegraphy have to work very hard indeed. Therefore I say the staff which is to be regulated by certain chiefs of the Department should possess the knowledge possessed by those chiefs, and I am most anxious at Southampton to establish a class where knowledge shall be imparted to our staff which I know to be the knowledge possessed by the chief of the Department. In order to acquire these results, the details of which I leave to be discussed in the committee, I am prepared to undertake the formation of a class which would perhaps come more within the category of Mr. Culley's third grade, his highest grade. I am prepared to do all I can down there for this purpose, and I am sure the result must be, if properly carried out, to add considerably to the acquisition of that knowledge which alone can make our Department as perfect as we wish it to be."

Mr. Culley then said :—

"I do not know that I can say much in addition, for the gentlemen who have just spoken have so exactly stated my own views in the matter. I am very glad to find that my two old colleagues are perfectly at one with myself in this important matter. I might say that one of my principal objects, if Mr. Scudamore will allow it to be so, is to let it be understood in the service that every clerk is *expected* to attend to his instruments. The feeling now among many is that it is an exceedingly undignified thing to look at a battery; that to look at a battery is a workman's job, that even to adjust an instrument is the work of some one lower in position than a telegraph clerk. That is what the clerks have been too apt to think, especially in my old company, the Electric Telegraph Company; they have felt 'there is a man who ought to attend to all those things, it is no business of mine;' I wish that to be swept away. I wish it to be understood that it is quite as gentlemanly for a person to understand the adjustment of his instrument as it is to understand how to signal with it. And I would wish merely to point out in conclusion how very absurd it would be to send out an engine driver with an express train on a wet morning who stuck fast on the first bank he came to because he did not know that he ought to sprinkle a little sand on the rails. None of our clerks understand what would be equivalent in telegraphy to the sprinkling of sand on the rails, none of them know the very simplest matters connected with our apparatus unless they have a taste for those matters themselves; they have never been taught them, and it has never been made part of their *duty* to understand them."

It is my impression that the readiest way of carrying out Mr. Culley's views and inducing the staff to instruct themselves, not merely in manipulation, but in the adjustment and management of the instruments, will be to offer them some pecuniary inducement to do so. When they find that a man who can not only work but adjust his instrument gets a little more than a man who can only work it, they will quite cease to be of opinion that it is *infra dig.* to be able to adjust it.

The subject having been thus fully discussed by the general meeting, and a general agreement on certain main principles having been arrived at, it was resolved that a small committee should be appointed to prepare a plan in detail for further consideration by the Postmaster-General and by the Treasury.

The following report has been received from the committee. I shall have to revert to it hereafter when I bring the question of establishment under notice, but I give it now with a view to show that full and careful attention has been given to a question which all will allow to be one of vital importance to the Department:—

REPORT of the COMMITTEE appointed to discuss the question of the Establishment of Schools, both for Manipulators and for Technical Instruction, and the question of the Allowances which should be given to learners in such Schools, and to instructors.

For Mr. Scudamore.

The Committee on the subject of Schools of Instruction, having carefully considered the various questions referred to them by Mr. Scudamore's minute of the 15th instant, beg to report the following conclusions, at which they have arrived in connexion therewith:—

1. That the towns in which the Department most requires schools for manipulators and for technical instruction are as follow, viz.:—

London.	Liverpool.	Nottingham.
Edinburgh.	Birmingham.	Bristol, and
Dublin.	Leeds.	Southampton.
Manchester.	Newcastle (or Carlisle).	

We recommend that the schools to be established in these towns shall be under the direction of a salaried instructor, competent to educate both as regards manipulation and the simpler technical matters; and we beg to append a schedule showing what districts can be best served from the respective schools.

SCHEDULE of proposed Schools of Instruction, with Districts to be served therefrom.

Locality of School.	District to be served.
London - - -	The Metropolitan District generally, together with the "Home" portions of the Eastern, South-Eastern, South-Western, and South Midland Districts.
Edinburgh - - -	Scotland, generally.
Dublin - - -	Ireland, generally.
Manchester—Liverpool - -	Local, and partly North-Western and North Wales Districts.
Birmingham - - -	North Wales and South Midland Districts.
Leeds - - -	North-Western, and partly Northern District.
Newcastle or Carlisle - -	Northern of England, and perhaps Southern of Scotland.
Nottingham - - -	North Midland—partly Eastern, and partly South Midland.
Bristol - - -	Western, and South Wales.
Southampton - - -	South-Western and South-Eastern.

"2 and 3. It has already been ascertained that accommodation exists at most of the towns above-named, while it is assumed that it can readily be afforded at the remainder; and special attention has been given to the important consideration as to the probability of finding the requisite number of eligible learners in recommending the localities of the respective schools.

"4. We recommend that the conditions of admission into the schools of persons not already in the service shall be the same as those now in force in connexion with the London, Edinburgh, and Dublin schools, with the following alterations and additions, viz.:—

"(a) That the limits of age be from 14 to 18.

"(b) That the nominations in Edinburgh and Dublin be vested in the secretary or controller of these offices, and those to schools in the provinces, in the postmaster.

"(c) That the candidates be medically examined by the medical officer of the Department prior to admission.

"5. The technical instruction to be communicated in these schools should be based upon such portions of Form H. 21, as refer to the mechanical construction and adjustment of the single needle and Morse printing instruments, the construction and arrangement of batteries, and a knowledge of the simpler technical terms.

"6. We propose, that those who have entered the schools shall be examined periodically as to their proficiency, as well in manipulative as in technical knowledge, by an officer especially appointed for the purpose, whose duties shall be held to embrace not simply the work of examination, but the inspection of the whole of the schools throughout the country. We attach the greatest importance to the condition that the instructor shall in no case be the examiner, and that the examinations shall in every case be conducted either by the inspecting officer above mentioned, or by a duly qualified person acting under his immediate instruction; our object being to secure the operation of an uniform principle throughout the service—not only in the arrangement of the schools, but in the conduct of the examinations, and to secure, as far as possible, an uniform standard of efficiency.

"When a learner has succeeded in passing the required examination, he should be furnished with a certificate entitling him to rank as a "probationer," and qualifying him for employment in a working office, as vacancies occur.

"7. The standard of efficiency to which persons not in the service should be required to attain before they are considered qualified for employment is, in our opinion, as follows, viz.: For manipulation, that

they should be able to read 12 and send 20 words per minute on the printing and single-needle instruments, and to read six words a minute by sound ; in addition to which they should be required to display a fair knowledge of the " H " set of instructions, and of the general routine of a telegraph office. For technical knowledge the standard can only be described as a practical acquaintance with the subjects enumerated in section 5 of this report.

" We hold it to be of importance that these standards should be attained after a period of instruction not exceeding three months, and that if at the end of the first month the learner has made insufficient progress to justify the expectation of his qualifying within the prescribed period, the inspector should be at liberty to recommend that he or she be requested to withdraw from the school.

" 8. We propose that no extra allowance shall be made to those persons now in the service who do not attain greater acquirements in technical knowledge than those demanded from a learner, as above described, but that they should be encouraged to further educate themselves by the prospect of a special allowance of 2s. a week on passing the required examination in the second or lower grade. This grade, it appears to us, naturally embraces a practical knowledge of the following points, viz., the electrical arrangements and mechanical construction of the apparatus, of the mode in which ordinary repairs can be effected, of the cleaning, refreshing, and testing of batteries, the method of localising faults by the use of the ordinary detector, as well as a slight elementary knowledge of electricity and magnetism.

" We would make it a condition that the allowance (applicable only to this grade) be rendered liable to suspension on its being certified by the divisional engineer that the clerk or other officer to whom it has been granted does not maintain the standard of efficiency, or fails to turn his acquirements to practical account.

" For the first or highest grade, comprising a knowledge of ' differential ' and ' resistance ' testing, translating apparatus, and the electrical arrangements and mechanical construction of the Wheatstone automatic and Hughes' instruments, we propose that no allowance shall be made beyond that for subsistence which will be necessary in bringing persons from a distance to receive instruction in the schools of the first class. We have been guided to this conclusion mainly by these considerations: first, that the Department will be put to considerable expense in organising and carrying on the special instruction which will be required in such cases ; and second, that persons who qualify in this grade will usually find their reward in the superior consideration which will be given by the Department to their claims for promotion to the higher positions in the service. For obvious reasons we consider it absolutely necessary that admission to these higher schools should be restricted to persons selected by the surveyor and divisional engineer ; and we are of opinion that this higher knowledge can only in the meantime be imparted at a central school to be formed in London, and at a school at Southampton, which it is proposed to affiliate to this central school. We think it probable, however, that when competent instructors can be found for the purpose, schools of this class may also be established in Edinburgh and Dublin.

" 9. The question of giving to instructors a bonus or capitation grant for qualified learners, as an inducement to push them on, is, in our opinion, restricted to the case of those offices where the clerk in charge or other equally competent officer acts as the teacher ; and in these cases we propose that a bonus of 10s. per head should be paid for each learner passed by a duly qualified and independent examiner. The surveyors will be best able to point out at which offices in their districts instruction by such persons can be most advantageously given. We are unanimously of opinion that no bonus whatever should be given to those instructors who are paid by a fixed salary as such.

" 10. It does not appear to us that actual interchanges of staff are practicable, unless in special cases ; and we are of opinion that in order to enable clerks from the smaller offices to attend the local schools, relief clerks must be employed, except in cases where overtime can be brought into operation to replace the absentees. We think that it should be left to the surveyors in cases where the probable advantages to be gained are worth the payment of a double subsistence allowance, to exchange clerks between offices in their own districts ; and we consider it probable that occasional interchanges of senior staff between London and a few of the larger offices that control the working of the circuits might prove advantageous.

" 11. The question as to the manner in which technical instruction may best be given at small offices is an important one, and has engaged our serious attention. While we are unanimously of opinion that the organization of the present engineering staff is fully equal to this important duty, we are equally divided in opinion as to the advisability of making any special payment to the members of that staff in respect of the instruction thus imparted. It is urged, on the one hand, that the engineering staff is capable of imparting this instruction without any special inducement—that it is their duty to do so, and that if called upon they will do so. On the other hand, it is urged that they will do so more promptly and heartily and more efficiently if they had the prospect of a bonus or some pecuniary reward, however trifling, for each qualified clerk who receives a certificate ; and those gentlemen who hold this view are of opinion that an allowance of 10s. a head would meet the case.

" We have had difficulty in dealing with the case of postmasters' assistants, who are not, in point of fact, in the service or pay of the Department. But looking at the fact that the technical knowledge which they might acquire would be of the greatest possible value to the service, we submit that unless there are departmental reasons against it, some consideration should be shown in their case ; and that in estimating the amount of the consideration, regard should be had to special circumstances, and to the recommendation of the divisional engineer.

" Having thus disposed of the several points referred to us, we desire to make one or two suggestions with regard to the present condition and future arrangement of the London School, which we specially visited during the progress of our deliberations. At present, the number of persons under instruction is considerably reduced from what it was a few weeks ago, and it appears to us that a favourable opportunity is thus presented for fixing the establishment at a proper limit, consistent with probable future requirements, and with the means of affording sound practical instruction, and close personal supervision. This number, we think, should not exceed 20 males, and 30 females ; and assuming this recommendation to meet with Mr. Scudamore's approval, we would further recommend that all the manipulative instruction should be carried on in the rooms at the front of the

building; the females, being the largest in number, occupying the larger rooms, and the males the smaller. Also, that the room at present occupied for the training of male learners should be fitted up and set apart for technical instruction of the simpler kind, which it is contemplated to impart to all learners; and that the present large number of effete single-needle instruments should be removed and replaced by efficient apparatus, including the addition of two or more 'Morse Sounders.'

"It only remains to touch upon one other point, viz., the discontinuance of the bonus of 1*l*. to competent learners, which has been in operation since some time before the transfer. We simply recommend that payment of this bonus should cease on and from the 31st of January next; and that, meanwhile, a notice to this effect should be inserted in the Official Circular, so that the Department may not be charged with breaking faith with any person who may now be in training with a view to the bonus.

A. M. CUNYNGHAME.
W. H. PREECE.
E. GRAVES.
ROBERT W. JOHNSTON.
J. C. LAMB.
H. EATON."

Reference is made in the foregoing report to a paper called "Form H. 21." This is an elaborate but simply expressed paper, which has been drawn up by Mr. Preece for the purpose of instructing (so far as a paper can instruct) telegraphists how to regulate and adjust their instruments, and how to detect and remove faults of various kinds.

This paper, which accompanies this report, and is marked D. has been distributed to all the clerks in the employ of the Department.

Diagrams, showing the connexions of the different instruments in use, have also been largely circulated. Copies marked E. accompany this report.

Reference has been made more than once in the foregoing pages to Professor Hughes. This gentleman, who is the inventor of the Hughes Type Printing Telegraph, to which reference will be made hereafter, is a native of the United States, but he generally resides in Paris, and devotes himself there to the improvement and development of his instrument, which is largely in use in France and throughout the Continent. Having been driven from France by the war, he has taken up his residence in London, and from no other motive than a love of science has voluntarily given instruction daily to a certain number of our clerks and candidates for admission in the working of his instrument, and, which is of more importance, in its construction and general principles. Professor Hughes is so situated as not to stand in need of any remuneration which could be given to him for his services, and the Department has great reason to congratulate itself on having been able to obtain the voluntary co-operation of so eminent a man.

ASSIMILATION OF CODES, INSTRUCTIONS, AND REGULATIONS.

Prior to the transfer two codes for signalling were in use in the United Kingdom. One code was that which had been specially arranged for the Bright's bell telegraph by the Magnetic Telegraph Company, and was in use at all the stations of that company; the other was the code known as the Morse alphabet, and was in use at the stations of the Electric and United Kingdom Companies. As it was absolutely necessary that the code should, as quickly as possible, be made uniform, and as the Morse code was in use by the greatest number of clerks, and was moreover the general telegraphic language of the world, it was chosen in preference to the Magnetic code. Early in the year 1869 the Magnetic Company's clerks were requested through their employers to make themselves acquainted with the Morse code, and we were more than once led to believe that they would have mastered it prior to the transfer.

All, however, had not mastered it at that date, and for many months we were compelled in a great number of cases to arrange the staff in such a manner that Magnetic clerks at one end of a circuit should have Magnetic clerks to work with at the other end. This difficulty has now almost entirely disappeared. For the use of the Magnetic clerks who had to learn the Morse code, and more especially for the guidance of the numerous fresh learners whom the Department had to train, a paper of "Instructions to persons engaged in learning the Morse alphabet" was prepared. As it may be necessary for me hereafter to refer to the Morse code, it will, perhaps, be convenient to have it described here, and I therefore give a few extracts from the paper in question.

Extracts.

"In sending messages by the single needle instrument the signals are formed by turning the top of the needle to the left or the right.

"In sending messages by the bell instrument the signals are formed by strokes on the left bell, or strokes on the right bell, of two bells placed opposite to each other.

"In sending a message by the Morse printing instrument the signals are formed of dots (· · · ·) and dashes (— — — —). A dot is produced by tapping the key or hammer of the sending instrument sharply. A dash is produced by holding down the same key or hammer while you can count three.

"In signalling on these instruments, a turn of the top point of the needle to the left (on the single needle instrument), a stroke on the left bell (of the bell instrument), and a dot (on the printing instrument), have one and the same meaning. A turn of the top point of the needle to the right, a stroke on the right bell, a dash on the printing instrument, have one and the same meaning. Turns and strokes to the left are the same signals as dots; turns and strokes to the right are the same signals as dashes. Thus if you know how to read a message on one of the three instruments, and keep this rule in mind, you may readily read the same message on either of the other two instruments.

"If you want to send the letter E on the single needle instrument you must cause the top point of the needle to turn once to the left, if you want to send the letter E on the bell instrument you must cause a stroke to fall on the left bell, if you want to send the letter E on the printing instrument you must produce a dot (·). If you want to send the letter T on the single needle instrument you must cause the top point of the needle to turn once to the right, if you want to send it on the bell instrument you must cause a stroke to fall on the right bell, if you want to send it on the printing instrument you must produce a dash (—). If when signals are sent to you you see the needle (of the single needle instrument) turn once to the left, or if you hear a stroke fall once on the left bell (of the bell instrument), or if you see a single dot (·) printed by the printing instrument, you will know that the letter E is sent to you. On the other hand, if you see the top of the needle turn once to the right, or hear one stroke on the right bell, or see a dash (—) printed before you, you will know that the letter T is sent to you."

The paper then proceeded to classify the signals and the letters which they denote in groups, and to provide a sort of "memoria technica" for the help of the learners. The groups are six in number and are thus arranged :

ALPHABET SIGNALS.

GROUP 1.		GROUP 2.		GROUP 3.	
E —	Earwigs	T —	Turnips	A — —	A
I — —	Infest	M — —	Make	W — — —	Wet
S — — —	Summer	O — — —	Oxen	J — — — —	Jacket's
H — — — —	Houses	Ch — — — —	Cheerful	U — — —	Uncomfortable
				V — — — —	Very
GROUP 4.		GROUP 5.		GROUP 6.	
N — —	No	R — — —	Remember !	K — — — —	Kindness
D — — —	Difficulty	L — — — —	Law	C — — — —	Conciliates
B — — — —	Baffles	P — — — —	Preserves	Y — — — —	Youth
G — — — —	Great	F — — — —	Freedom	X — — — —	Xtremely
Z — — — —	Zeal			Q — — — —	Quickly

NOTE.—The sentences in each group are intended to help the learner to remember the initial letters, which it will be seen form each group.

The following extracts from the paper may not be without interest, as showing the pains which we took to make the instruction simple and clear.

Extracts.

"You may help your memory still further by considering—

- That all the signals in the first group are left strokes or dots.
- That all the signals in the second group are right strokes or dashes.
- That all the signals in the third and fifth groups begin with left strokes or dots.
- That all the signals in the fourth and sixth groups begin with right strokes or dashes ; so that
- The left strokes or dots take the lead in groups, 1, 3, 5, whilst the right strokes or dashes take the lead in groups 2, 4, 6.
- You should also fix well in your memory that the signals for E, I, S, H, are the exact opposites of the signals for T, M, O, CH, that the signals for A, W, J, U, are the exact opposites of the signals for N, D, B, G, and that the signals for R, L, P, F, are the exact opposites of the signals for K, Y, X, Q.

Take the following rules for your guidance in learning :—

- Begin with the easiest groups, and get one group by heart before you begin another.
- Do not, as you learn, say, "E is one stroke to the left, or one dot," but say, "One stroke to the left, or one dot, means E."
- When you have got one or more groups by heart get some one to examine you.
- The examiner must not call out a letter and ask you for the signal belonging to it ; he must call out the signal and ask you for the letter belonging to it ; thus—

Question.—One right	Answer.—T
" Dot, dash, dot	" R
" Two left	" I
" Four right	" Ch
" Dash, dot, dash	" K
" Right, left, right, left	" C

- e. It will help you much also to write out sentences from books or newspapers in the dot and dash alphabet, always bearing in mind, as you will, that dots are left strokes, and dashes right strokes.
- f. With a box of ordinary toy bricks you may carry on silent conversations in the dot and dash alphabet, using the half bricks as dots, and the whole bricks as dashes."

But another, and in some respects a more troublesome assimilation had to be effected. For the sake of dispatch in signalling, telegraph stations are known by certain abbreviated names composed of one or more letters, and these abbreviated names are signalled in place of the full names. Thus Edinburgh is known as EH, Liverpool as LV, and Glasgow as GW. Prior to the transfer the name codes of the companies differed widely. Thus Dublin was called DU by one company and DB by another, Belfast was BT with one and BFT with another; Newcastle was NC with one and NT with another, and Newport (Mon.) was NT with one and DT with another. Then, again, as five companies had central stations in London, there were four different names for London to wit, LY (Lothbury), GH (Gresham House), CO (Cannon Street), L, and LN. This, however, was not all. The systems of the companies had outgrown the natural limits of their codes. The Electric Company started with a two letter code. Each letter of the alphabet afforded them 26 permutations thus, AA, AB, AC, &c., and so long as they had not more than 26 stations the proper names of which began with the same initial letter, they had no difficulty in finding code names which were suggestive of the names of the stations represented by them; but when they got beyond this limit, and had to form fresh permutations the code names ceased to be suggestive. Thus KR was not suggestive of Cardiff or KX of the Stock Exchange, nor were UA, YS, RW, KT, ATZ, and VT good and natural representatives of Clapham, Crystal Palace, Derby, Stockport, Margate, and Coventry.

The Post Office had not merely to assimilate the existing codes, and to simplify them by the extirpation of incongruous names, it had also to provide a code which should include a much larger number of stations than the combined companies had provided for. Mr. Baines, who devised the code now in use, proceeded upon the plan of a two letter code for head post offices, and a three letter code for sub-offices, and succeeded at once in preserving all the best of the then existing names, and providing names for all the offices which we are likely to open for a long time to come. The following extracts from the official code book will show the principle and the comprehensive nature of the code which he has devised.

Extract.

[illegible]

In the foregoing extract some of the permutations appear to be omitted, but they are not really omitted. AB, for instance, appears in the list of Scotch offices as the code name for Aberdeen, and AAR appears in the Metropolitan list as the code name for Abbey Road, St. John's Wood. That the code names of Abergavenny, Aberystwith, Abingdon, Accrington, and Acklington do not, though the proper names of those towns do, stand in strict alphabetical order, is attributable to the fact that we have retained the best of the old code names wherever we could do so.

The following extract shows that having retained BM as the code name for Birmingham, and being desirous of finding code names for the offices on the local system of Birmingham which should not interfere with the general scheme, we have taken for the initial of their code names the letter Q which is wanted for scarcely any places.

Remarks for the guidance of Counter Clerks.	Name of Divisional Engineer.	Transmitting Offices.	Hours of Attendance.			Code Signal.	Telegraph Offices.	Head Post Office or County.
			On Week Days.	On Sundays.				
	Graves -	General	A.M. P.M.	A.M. P.M.		B M	BIRMINGHAM (Canon Street).	
	Graves	BM	8.0—8.0	—	—	Q B A	Aston Street.	
	Graves	BM	8.0—8.0	—	—	Q B B	Barker Street.	
						Q B C	Bloomsbury.	
	Graves ..	BM	8.0—8.0	—	—	Q B D	Bristol Road.	
	Graves	BM	8.0—8.0	—	—	Q B E	Constitution Hill.	
	Graves -	BM	8.0—8.0	—	—	Q B F	Deritend.	
	Graves	BM	9.0—6.0	—	—	Q B G	Exchange.	
	Graves -	BM	8.0—8.0	—	—	Q B H	Fiveways.	

The following further extract will probably suffice as an illustration of the existing code.

Remarks for the guidance of Counter Clerks.	Name of Divisional Engineer.	Transmitting Offices.	Hours of Attendance.			Code Signal.	Telegraph Offices.	Head Post Office or County.
			On Week Days.	On Sundays.				
	Walsh	BHK	A.M. P.M.	A.M. P.M.		C M T	Cottingham	Hull.
			7.0—8.0	8.0—10.0		C M X	Coundon	Bishop Auckland.
	Graves -	BM, LE, TS	7.0—12.0	7.0—10.0	—	C V	COVENTRY.	
						C N A	Chapelfields.	
	Graves	CF, SX	7.0—8.0	7.0—10.0	—	C N C	Hill Field.	
						C N E	COWBRIDGE.	
	Preece	SO	7.0—8.0	7.30—10.0	—	C N G	Cowden	Eden-Bridge.
						C N I	COWES, Isle of Wight.	
	Walsh	FH	7.0—8.0	8.0—10.0	—	C N K	Cowfold	Horsham.
						C N M	Coxhoe	Ferryhill.
	Walsh	NT	7.0—8.0	7.30—10.0	—	C N O	Cradley Heath	Brierley Hill.
	Preece -	SA	8.0—8.0	8.0—10.0	—	C N R	Cramlington	New-on-Tyne.
	Preece -	AD	7.0—9.0	7.0—10.0	—	C N T	Cranbourne	Salisbury.
						C N V	Cranbrook	Staplehurst.
						C N X	Cranleigh	Guildford.
						C N Z	Craven Arms	Salop.
	Preece -	TS	7.0—9.0	{ 7.0—8.0 9.0—10.0 }	—	C Y	CRAWLEY	

The preparation of this code was one of the many pieces of work which the Department was compelled to accomplish, but which could not make any show whatever.

It was also necessary to prepare complete "Instructions to the persons who were to be engaged in receiving telegrams from the public, or in transmitting or receiving these telegrams by wire, or in delivering them, or in bringing to account the charges for transmission and delivery." These instructions accompany this report. They contain a complete statement of the mode in which I intended the work to be done, and a pattern of every form or book of account which I designed to use. No pains were spared to make them full, but at the same time simple, nor, though they fill 31 quarto pages, was there anything in them that could with propriety be omitted.

They were followed by a paper of seven pages relative to the inland tariff and the rules for the transmission of inland messages, and by a paper respecting the tariff and regulations for the transmission of Continental and Indian and American messages, which latter paper was accompanied by a list of foreign stations, and filled 48 quarto pages.

These last papers were intended partly for the guidance of the officers and partly for exhibition to the public.

Some additions to, but scarcely any changes in the rules and regulations thus drawn up have been made since they were issued. The system is conducted as nearly as possible in the manner prescribed before the transfer took place, but as a matter of course some time elapsed before the whole of the regulations were generally understood and systematically enforced.

THE TRANSFER.

6. Under circumstances such as those which have been described in the foregoing pages the general transfer took place on the 5th February. It will be apparent that

much of what we hoped to have done prior to that time was unavoidably incomplete when the moment for the transfer arrived, and that it was absolutely impossible that we could start with anything like an approach to a perfect system. I propose now to show what we really have been able to accomplish up to the present time, and what we still have in hand and are about immediately to complete, and I think that I shall best be able to put before you a complete statement of the system as it is and as it will be if I give a full description of our central station in Telegraph Street, and of the business as it is transacted there.

I shall be able in the course of the description to show in what respects the London system differs from or resembles that of our provincial offices, and thus make the description of the system of the central station serve for a description of the entire system of the kingdom.

THE CENTRAL STATION.

The central station is situated in Telegraph Street, which is a small street opening out of the east side of Moorgate Street. The building was acquired from the Electric and International Company, who had built it on ground leased from the Clothworker's Company. I propose presently to insert diagrams of the second and third floors of the building which are exclusively devoted to the receipt and transmission of messages. From these diagrams it will be seen that the buildings consist of a main body and two wings. The erection of the wings was of later date than that of the main body, and as a matter of course this piecemeal erection has prevented us from making so satisfactory an arrangement of the work as would have been possible if the building had been erected at one time and with one purpose. The building consists of a basement floor, a ground floor, and a first, a second, and a third floor. Under the Electric Company the basement was set apart for the engine room, the messengers' waiting room and dining room, and the store rooms. The first floor was set apart for the accountants' and engineers' offices; the second floor for the board room, and the rooms of the Secretariat and the Intelligence Department. The second floor was mainly given up to the dining rooms of the female and male staff. The third floor was devoted to the receipt and transmission of messages. There was some vacant space on each floor in the wings, which were not finished until shortly before the transfer, and on the ground floor and first floor space was found for the Anglo-American Company and the Indo-European Company, who were sub-tenants of the Electric Company. The building has been entirely re-arranged by the Post Office. The whole of the third and second floors (with the exception of a small room on the second floor which has been allotted to Mr. Eaton, who has charge of the lines) has been given up to the work connected with the receipt and transmission of messages. On the first floor, offices for the engineering staff and the superintendent of the station have been retained, but the board room and the rooms of the Secretariat have been converted into a dining room and kitchen for the female staff, and a sitting room for their matron. On the ground floor, space has been found for a "sending out" or delivery room, with a retiring room for the female sending out clerks; for the messengers' dining room, and for the office of their inspectors; for the dining rooms of the male staff; for a writing room for the Press; for the surgery and consulting room of the medical officer; for the Intelligence Department, and for the engineers' workshops. The basement has been appropriated to the engines, the batteries, and the stores. The Anglo-American Company and the Indo-European Company still occupy the rooms which they leased from the Electric Company.

The following diagrams show the arrangement of the instruments and other mechanical appliances in the rooms set apart for the reception and transmission of messages. I will proceed first to the description of the work done in what is called "The Provincial Gallery," which is on the third floor of the building.

The central station is in the main what the Post Office would call a "forwarding" and what the Telegraph Companies called a "transmitting" stations, that is to say, its chief business consists in the receipt of messages from one place for re-transmission to some other place. It does receive some messages for delivery within a certain area, and, during the night, it is open for the collection of messages from the public; but its work is mainly that of re-transmission. It receives and despatches messages by pneumatic tubes and by wires.

PNEUMATIC TUBES.

The position of these tubes, which are arranged immediately opposite to the entrance from the Metropolitan Gallery, is shown on the diagram. The tubes are in a minor degree used to connect the Provincial Gallery with other parts of the central station, but mainly to connect the central station with certain other stations which collect or collect and deliver more messages than we could conveniently and expeditiously transmit by wire. Two systems of working the pneumatic tubes are in operation in Telegraph Street—the system of Mr. Latimer Clark, which had been adopted by the Electric Company long prior to the transfer, and the system of the Messrs. Siemens, which has been introduced into this country for the first time by this Department. The following statement gives the direction, length, and diameter of each of the tubes worked on Mr. Latimer Clark's system, and the time occupied in the transmission of a carrier through each according as the carriers are propelled or sucked through the tubes. The tubes against the names of which an asterisk has been placed are house tubes. Those which are marked with a dagger have been laid down by the Department.

RETURN showing the NUMBER of PNEUMATIC TUBES worked on CLARK'S SYSTEM in LONDON, and the TIME OCCUPIED in the TRANSMISSION of MESSAGES, &c.

From (Engine Station).	To	Indicated Horse Power of Engine.	Length of Tube.	Diameter of Tube.	Time occupied in Transmission.	
					Pressure.	Vacuum.
Telegraph Street -	Fenchurch Street -	40	980	2 $\frac{1}{4}$	1 5	1 20
" -	Leadenhall Street -	"	659	2 $\frac{1}{4}$	0 35	0 38
† " -	Baltic Coffee House -	"	590	2 $\frac{1}{4}$	0 35	0 38
" -	Gresham House -	"	588	1 $\frac{1}{2}$	0 40	0 51
† " -	Threadneedle Street -	"	566	2 $\frac{1}{4}$	0 34	0 48 ¹
† " -	Threadneedle Street -	"	559	2 $\frac{1}{4}$	0 32	0 45 ²
" -	Cornhill -	"	490	1 $\frac{1}{2}$	0 37	0 40
" -	Old Broad Street -	"	370	1 $\frac{1}{2}$	0 25	0 29 ³
† " -	Lloyd's -	"	343	1 $\frac{1}{2}$	0 17	0 25 ⁴
" -	Stock Exchange -	"	314	1 $\frac{1}{2}$	0 15	0 15
" -	Founder's Court -	"	223	1 $\frac{1}{2}$	0 13	0 14
" -	*Anglo-American Office -	"	62	2 $\frac{1}{4}$	0 5	0 6
" -	*Indo-European Office -	"	57	2 $\frac{1}{4}$	0 5	0 5
" -	*Engineer's Office -	"	50	2 $\frac{1}{4}$	0 4	0 5
" -	*South Gallery -	"	50	2 $\frac{1}{4}$	—	—
" -	*Intelligence Department -	"	44	1 $\frac{1}{2}$	0 5	0 6
† " -	*Metropolitan Gallery -	"	29	2 $\frac{1}{4}$	0 5	0 4
Total length, yards -			5,974			

It would be impossible to serve the above-named stations properly in any other way than by pneumatic tube. The messages sent from and to those stations are very important as well as very numerous. They are, moreover, crowded into the busy part of the day, between the hours of 11 a.m. and 4 p.m., and they are liable to sudden augmentations when the turn of an important market, or the declaration of a new rate of discount, or a political crisis gives a stimulus to trade or to speculation. It would be impossible in the case of such offices to make such a provision of wires or staff as would enable us to get the work off promptly, but the tubes which will transmit, according to their diameter, from 8 to 20 messages in one carrier, give us the facilities which we require.

It will be observed that the whole of the above-described tubes work eastwards from Telegraph Street. The Electric Company had no tubes to the west, but it was obvious to me before the transfer took place that, looking to the great increase of business which might be expected to follow the transfer, it would be necessary for the Depart-

ment to lay tubes to stations west of Telegraph Street. I felt that it would be absolutely necessary for us to connect Telegraph Street with the General Post Office, and with our offices at Temple Bar, and Charing Cross, and I was very anxious also to connect it with the House of Commons. Other offices in a westerly direction are likely to require a tube service, but to these I need not now refer. More than four years ago, when I was engaged under the direction of Lord Stanley of Alderley in making inquiry as to the soundness of the proposals for the transfer of the telegraphs to Government, the Messrs. Siemens and Halske of London and Berlin, brought under my notice a system of pneumatic tubes which they had devised, and which they had brought into actual operation in Berlin. Their letters to me on this subject were printed in the appendix to my first report (July 1866).

In the autumn of 1868, Mr. William Page, of this office, was required to visit Berlin on Post Office business, and was requested to inspect and report upon the working of the system which the Messrs. Siemens had established in that city. His report is contained in the volume of printed papers which accompanies this report. When it became obvious that it was necessary for us to connect Telegraph Street with the westward stations which I have named, it appeared both to Mr. Culley and myself that the time had arrived when it would be well to give the system of Messrs. Siemens a trial. By means of that system the central station and the General Post Office have for some months been connected, and within the last few days the system has been extended to our office at Temple Bar. The extension to Charing Cross is in hand.

The Central station, the General Post Office, and the Temple Bar office are now connected by a double tube, forming a complete circuit, and having a column of air always passing through it. The air is moved either by pressure or by vacuum, or by pressure and vacuum. The diameter of the tube is 3 inches; the length of double tube from Telegraph Street to the General Post Office is 852×2 yards; the length from the General Post Office to the Temple Bar office is 1333×2 yards.

The double tube forms what may be called a pneumatic railway, with an up line and a down line having their termini in Telegraph Street and at Temple Bar, and an intermediate station at the General Post Office. The up and down lines may be open through their entire length, or may be blocked by switch boxes at the intermediate station. The terminal stations can send carriers through to each other without stop at the intermediate station, or can send carriers to be stopped by the switch-box at the intermediate station, and the intermediate station when it knows a through carrier to be coming for one of the termini, can, if it happens to have any messages of its own for that terminus, switch out the through carrier, insert its own messages, and send the carrier on again without any appreciable delay. The tube being of large size the carriers are proportionately large, and each will hold about 50 messages. When pressure and vacuum are employed the distance between Telegraph Street and Temple Bar is traversed in three minutes. When vacuum only is employed five minutes are required for the transmission. The tube is now working much within its power and yet is doing work which fully occupied six wires and 12 clerks. If the extension to Charing Cross be successful, as there is every reason to suppose, the tube will take up with ease the work of 12 more clerks.

The line is worked on the railway block system, being fitted for that purpose with Tyer's patent train signalling apparatus. The following instructions which have been drawn up for the use of the intermediate station will show the working of the system.

GENERAL POST OFFICE.

Instructions for working Pneumatic Pipes.

The UP PIPE is intended for traffic to the City.
 The DOWN PIPE " " from "
 The Black indicator records signals last received.
 The Red " " " sent.

THROUGH CARRIERS.

Telegraph Street to Temple Bar.

1. Telegraph Street will, in all cases, signal a carrier leaving his station for Temple Bar by giving four beats on your gong, which you will acknowledge by pressing the plunger marked TRAIN ON LINE four times.
2. On the arrival of the carrier you will acknowledge it by pressing the plunger marked LINE CLEAR once, Telegraph Street will acknowledge this signal by ringing your gong once.
3. You will immediately signal this on to Temple Bar, by pressing the plunger marked Gong four times; Temple Bar will acknowledge this by repeating your signal on the BELL, and moving your Black indicator to TRAIN ON LINE.

4. On the arrival of the carrier at Temple Bar, that station will ring your BELL once, and move your Black indicator to LINE CLEAR. You will acknowledge this signal by pressing the plunger marked Gong once.

Should a second through carrier reach your station before the acknowledgment of the first has been signalled, you will allow it to proceed, but on receiving the acknowledgment of the arrival of the first, you will immediately signal the second forward.

If a carrier belonging to another station be stopped in error, it is to be immediately forwarded to its destination.

Carriers for St. Martin's will be White.
 „ „ Temple Bar „ Green.

The arrangements of the tubes are not precisely the same as those which are in use in Berlin, but the systems are alike in principle.

Mr. Culley and Mr. Eaton have exerted themselves greatly to perfect the system, and I think it likely that the Messrs. Siemens would gladly bear witness to the value of their exertions.

In a previous part of this report I have stated that the Department has extended the pneumatic tube system in the large provincial towns. The following statement gives the direction, length, and dimensions, &c. of these tubes.

RETURN showing the NUMBER of PNEUMATIC TUBES in PROVINCIAL TOWNS, and the TIME OCCUPIED in the TRANSMISSION of MESSAGES, &c.

(The tubes marked * have been laid since the Transfer.)

Town.	From (Engine Station).	To	Indicated Horse Power of Engine.	Length of Tube.	Diameter of Tube.	Time occupied in Transmission.		Remarks.
						Pressure.	Vacuum.	
VERPOOL	*General Post Office	Exchange -	17	Yards. 791	Inches. 2 $\frac{1}{4}$	Min. sec. 0 45	Min. sec. 0 57 $\frac{1}{2}$	These tubes are all worked on Clark's system.
	* " -	Water Street -	"	797	1 $\frac{1}{2}$	1 5	—	
	* " Counter	Gallery -	"	24	1 $\frac{1}{2}$	0 4	—	
	Total length, yards -			1,612				
ANCHESTER	York Street -	Ducie Buildings -	13	500	1 $\frac{1}{2}$	0 29	0 30	
	" -	Mosley Street -	"	300	1 $\frac{1}{2}$	0 16	0 17	
	* " -	Post Office -	"	225	1 $\frac{1}{2}$	0 8 $\frac{1}{2}$	0 9	
	" -	Counter -	"	17	1 $\frac{1}{2}$	0 2	0 2	
	Total length, yards -			1,042				
BIRMINGHAM	Exchange Buildings	New Street Ry. Station	3	140	1 $\frac{1}{2}$	0 6 $\frac{1}{2}$	—	
	* " -	Cannon Street -	"	240	1 $\frac{1}{2}$	0 11	—	
	* " -	Post Office -	"	318	1 $\frac{1}{2}$	0 24	—	
	Total length, yards -			698				
GLASGOW	*General Post Office	Royal Exchange -	7	242	2 $\frac{1}{4}$	0 22	0 30	

Three tubes, one of 1,530 yards and two of 700 yards each, are being laid down in Dublin.

SORTATION OF MESSAGES.

In the Provincial Gallery and immediately in front of the pneumatic tubes are the sorting tables at which the sortation of the messages coming through the tubes from the collecting stations, and of the messages going through the tubes to the delivering stations, is effected. Taking first the sortation of the messages coming through the tubes from the collecting stations for re-transmission by Telegraph Street, I may observe that they have to be re-transmitted either to some other part of London, or to some part of the country, or abroad. If they are to be sent to some other part of London, they are sent down to the Metropolitan Gallery. If they are to be sent to America, they are sent to the joint office of the Anglo-American and French Atlantic Companies. If they are to be sent to India, they are sent, in accordance with the directions of their senders, either to the Indo-European Company, or to the joint office of the British Indian Submarine Company, and the Falmouth, Malta, and Gibraltar Company. If

they are to be sent to any part of the Continent, except the parts served by the cables of the Great Northern (Danish Norwegian) Telegraph Company, they are sent to the Submarine Telegraph Company in Threadneedle Street, who work the cables between this country and France and Belgium, which are their own property, and also those between this country and Holland, and this country and Norderney on the coast of Hanover, which are the property of this Department. Messages intended for those parts of the Continent which are served by the cables of the Great Northern Telegraph Company, are sent to the Newcastle and Edinburgh circuits. Messages intended for transmission to some provincial place, are sorted to one of the four great divisions in which the provincial circuits have been arranged. These are:—

- | | |
|--|----|
| 1. Circuits for the west and south-west of England and the Channel Islands ; | D. |
| 2. Circuits for the east and south-east of England ; | B. |
| 3. Circuits for the north-east and north of England, and for Scotland ; | C. |
| 4. Circuits for the north-west of England, Ireland, and the Isle of Man. | A. |

These divisions are respectively under the control of the under-mentioned female clerks in charge:—

Miss Hayward,
Miss Noakes,
Miss Greer, and
Miss Ward.

The sorting table for messages coming through the tubes from the collecting offices is therefore thus subdivided:—

1. Pan for Miss Hayward's division ;
2. „ Miss Noakes' division ;
3. „ Miss Greer's division ;
4. „ Miss Ward's division ;
5. „ Metropolitan Gallery ;
6. „ Foreign Parts ;
7. Spare ;
8. Blind.

Each of the four divisions of the provincial gallery is provided with a sorting table similarly arranged, with the slight exception that the seventh pan is appropriated to messages which are to be delivered from Telegraph Street, or from some one of the offices which are connected with Telegraph Street by tube. The eighth pan is in all cases a “blind” pan, and devoted to messages the circulation of which is doubtful. The term “blind” has long been applied in the Post Office to the sorter who deals with letters of doubtful circulation, or which have been illegibly or imperfectly addressed.

The following examples will serve still further to illustrate the system of sortation :

- (a.) A message from Fenchurch Street for Glasgow, or for a station to which Glasgow transmits, is sorted at the tube sorting table to Miss Greer's division, and carried by one of Miss Greer's collectors to the Glasgow circuits.
- (b.) A message coming from Manchester for transmission to Exeter, is taken from the Manchester circuits in Miss Ward's division to the sorting table of her division, and sorted to Miss Hayward's division, and carried by Miss Hayward's collectors to the Exeter circuits.
- (c.) A message coming from Hull for delivery from Telegraph Street, or from the offices connected by tube with Telegraph Street, is carried from the Hull circuits in Miss Noakes' division to the sorting table of that division, where it is sorted to the delivery pan, and thence carried to the delivery table in front of the tubes. Here it is sorted to the tube by which it is to be sent out for delivery.

The messages passing in and out of the station are recorded and numbered at the sorting tables to which they are carried, and an accurate numerical account of them is compiled daily. At the delivery table again, an account is kept from hour to hour of the number of messages sent out for delivery in each hour ; so that the superintendent of the station may see whether the work is progressing at the proper rate.

The greatest number of messages which have as yet passed through this station in a day passed on the 18th July 1870 when the war panic was at its height, and 20,595

messages passed. Of those nearly 11,000 came in by wire, and went out by wire, and thus gave rise to two distinct telegraphic operations.

Fortunately our organization was so complete, and our staff so well trained by this time, that the work was done much better and more expeditiously than at the outset of our undertaking, when the average number of messages passing through the station daily did not exceed 13,000.

I have nothing to add to this part of my statement but that the Provincial Gallery is connected with the Metropolitan Gallery by a tube and a lift, the position of which is shown on the diagrams, and that both the Provincial and Metropolitan Galleries are connected with the sending out room on the ground floor by shoots.

WIRE CIRCUITS.

The bulk of the work done at the central station consists, as I have already stated, of the receipt of messages by wire for re-transmission by wire. Nearly 300 wire circuits work into and out of the central station. Many of these circuits accommodate more than one station, but on the other hand many stations, as for example Liverpool and Manchester, require much more than one circuit. The result is that the central station is in direct communication with about as many stations as there are circuits working from it, that is with about 115 Metropolitan stations and about 190 provincial stations. As I have already shown, the circuits are arranged geographically. In addition to this the circuits serving any one town or district are placed side by side. All the Liverpool circuits are in one room; and all the Charing Cross, or all the House of Commons circuits are located together. The advantages of this arrangement are obvious. The clerks in charge can at a glance see whether the wires serving an important town or district are all equally busy, and can make arrangements for feeding all circuits equally with messages. The geographical arrangement of circuits has been carried out in every large town in the kingdom.

INSTRUMENTS.

The Department employs almost every form, if not quite every form, of instrument known to the telegraph companies, but it has made strenuous efforts to discontinue the use of the less perfect, and to extend the use of the more perfect forms.

We have considerably extended the use of Wheatstone's A, B, C, instrument, which was originally designed to work on private wires between offices and factories, but was also used by the Universal Private Telegraph Company for the transmission of public messages on their West Highland lines. This instrument, partly because it is furnished with a bell or alarum which enables the sender to engage the attention of the receiver, and partly because on it the messages are spelt out to sender and receiver by the motion of a needle or pointer round a dial on which the letters of the alphabet are printed, is peculiarly suited to our smallest offices, which are kept by persons who cannot watch the instrument continuously, but require to have their attention called to it from time to time, and who are, moreover, unable to accomplish the manipulation of the more difficult instruments. In Telegraph Street this instrument, as the diagrams show, is used only on quasi-private wires, but we are rapidly extending its employment on rural circuits.

The Department has introduced very largely an improved form of single needle instrument. Signals on this instrument, as I have already stated, are composed of turns (of the top of the needle) to the right or to the left. In the old form of instrument the motions of the needle were produced by turning a pendent handle; in the form introduced by the Department the motions of the needle are produced by depressing two tappers or pedals resembling the keys of a piano. This form of single needle instrument can be and is used in circuit with Bright's Bell instrument which is also worked by keys or tappers.

This last-named instrument, when it is on a good wire, and worked by a thoroughly practised clerk, capable of adjusting it as circumstances require, is one of great value. I have constantly witnessed the transmission by it of 50 messages per wire per hour, for several consecutive hours. But as it is not a recording instrument, as it requires twice as much regulation as an ordinary Morse printing instrument requires, and as it does not admit of the application of "double current," the best stimulus to weak wires, Mr. Culley considers that the use of it should be discouraged, and that if we are to work much with non-recording and acoustic instruments we should have recourse to

the American "Sounder," which is at once more easy to regulate and to work than the bell.

We have also largely extended the use of "double current" Morse instruments. Indeed, if we had not done this, some of our wires would scarcely have been workable up to the present time.

There are two descriptions of Morse printing instrument, one which indents or embosses the dots and dashes on a paper riband, and one which writes them with ink on the riband. The marks made by the embosser are not so easily read, especially by a bad light, as those made by the inker. We have extended the use of the inker, and there is a general demand for it from all stations. Mr. Culley, however, remembers the time when there was a strong prejudice against it, and when it was necessary to introduce it by compulsion. Much the same antipathy was at first exhibited towards the single needles with tappers which we have introduced in preference to the needles with drop handles.

We propose gradually to transfer the existing Morse embossers to less important stations until they are worn out; to convert them, when we can do so, into inkers, and to use some of them as dummies in the instruction of learners.

I have already alluded to the extended use made by the Department of Varley's undemagnetisable coils.

We have also paid great attention to the working of the "Hughes type printing instrument." This most beautiful instrument, which prints its messages at both ends of the line in Roman type on a riband of paper, was in use in this country prior to the transfer, by the United Kingdom Company only. The instruments handed over to us by that company were of the oldest form, and in the opinion of Professor Hughes, the inventor, their working had been impeded by certain electrical arrangements which the officers of the company had erroneously thought it necessary to superadd.

The instruments which we are now using are either quite new, with all the latest improvements, or are repaired instruments, with the latest improvements added. In their re-arrangement we have had the benefit of the advice and assistance of Professor Hughes. Mr. Culley, who has studied the working of these instruments on the Continent, where they are largely used, thinks it desirable that they should be concentrated in large offices, where there is a staff competent to attend to their adjustment and regulation—matters of some difficulty. We are accordingly working them now on five circuits between London and Liverpool, and on two between London and Manchester, and we propose shortly to employ them between Manchester and Liverpool.

We shall extend their use as we can obtain instruments. Unfortunately we have 10 locked up in Paris where they were sent for repair; whilst the manufacture of some new instruments which we ordered from Berlin has been retarded by the scarcity of hands there. In proportion to the staff required to work it, this instrument turns out more work than any other. A Hughes circuit with one clerk at each end can turn out 60 messages an hour ready printed for delivery. But it has this additional advantage. The message which it sends is printed simultaneously at both ends of the circuit, and whatever is printed at one end must be printed at the other. Thus the sender can see whether he is sending a message in accordance with the copy before him, and if he makes blunders can immediately correct them. For this reason the instrument is peculiarly adapted for messages in foreign languages, and for code or cipher messages, and where we use it we employ it primarily for such messages.

We have taken especial pains to extend and improve the working of the Wheatstone automatic instrument. This instrument consists of two parts. By one part, which is called a puncher or perforator, the signals representing the messages are punched out on a riband of paper. The punched riband is then passed through the other part which is called the transmitter, and which transmits the signals automatically and with unerring accuracy to the other end of the line. The transmitter can work up to 180 words a minute, but the punching, which is done by hand, rarely gets beyond a rate of 40 words a minute. Nor could one clerk at the receiving end write out, as a general rule, more than 40 words a minute. In order, therefore, to get the full value out of the instrument, by equalising the speed of the punchers and writers with that of the transmitters, it is necessary to employ several punchers and writers to every transmitter, to punch the messages in batches, by several hands, and to divide the received riband amongst several writers. By these means the transmitters are fed with the required rapidity. Prior to the transfer, this instrument was in use only between London and Newcastle, London and Edinburgh, and London and Glasgow, and it did not in practice turn out more than 60 messages per hour on

any one circuit. Now, however, thanks to the pains which Mr. Culley has bestowed upon the arrangement of the instrument itself, and thanks also to the attention which Mr. Fischer, the superintendent in Telegraph Street, and some of the leading officers in the country, amongst whom I may especially mention Mr. Beaufort, the postmaster of Manchester, have given to the organisation of the staff, we constantly get 90 messages per hour on each of many circuits, and have often done 150 to 160 messages an hour on some circuits. The following return shows the work done by one Manchester Wheatstone circuit in each hour of the day between 10 a.m. and 8 p.m. on the 10th instant. It is rather below the average work of this circuit.

January 10th, 1871.

MANCHESTER—WHEATSTONE.

Time.	Messages forwarded.	Messages received.	Total.	REMARKS.
10 to 11 a.m.	46	23	69	Clear.
11 „ 12 „	65	60	125	—
12 „ 1 p.m.	67	63	130	—
1 „ 2 „	66	71	137	—
2 „ 3 „	52	66	118	—
3 „ 4 „	31	36	67	Clear.
4 „ 5 „	20	31	51	„
5 „ 6 „	18	24	42	„
6 „ 7 „	9	22	31	„
7 „ 8 „	9	20	29	„
			799	

The return shows that more than 500 messages were sent on one wire in four hours. With the ordinary Morse instrument not more than 40 messages per hour could be sent regularly on one wire; so that the automatic instrument may be said to have trebled the power of the wire. In times of great pressure, and when either from a sudden glut of business, or from the breaking down of wires, there is a superabundance of messages to be sent over one wire, we can, by putting on additional staff, and working the instrument at high speed, make one wire do the work of four.

Some time before the transfer, in anticipation of the increase of business which we expected to accrue, a considerable number of automatic instruments was ordered. It was not until after the transfer, however, that the first set was delivered, and they have come in very slowly since, the manufacture having been greatly retarded by the departure of many German workmen from this country. We have, however, brought them into use as fast as we received them, and they are now at work on the following circuits:—

2 London and Edinburgh.
 2 „ Newcastle.
 2 „ Liverpool.
 1 „ Manchester.
 1 „ Glasgow.
 1 „ York.
 1 „ Hull.
 1 „ Leeds.
 1 „ Bradford.
 1 „ Cardiff.
 1 „ Plymouth.
 1 „ Exeter.
 1 „ Dublin.
 1 „ Cork.
 1 Manchester and Glasgow.
 1 Liverpool and Glasgow.
 1 „ Belfast.

Our latest application of the instrument has been to the transmission of news. The punched riband can be passed through almost any number of transmitters in turn, and as the news agencies hand in habitually identical news for a large number

of towns, we can punch that news and pass one and the same riband through as many transmitters as we please.

The diagram of the Provincial Gallery shows that on one table we have the following express news circuits :

1. Birmingham, Manchester, Liverpool.
2. Leeds, Nottingham, Newcastle, Sheffield, Edinburgh, Glasgow.
3. Bristol, Cardiff, Newport, Plymouth, Exeter, Gloucester.

The towns on each of these circuits receive their news simultaneously. For some time after the transfer the news was sent on these circuits by the bell instrument, but it is now sent by the Wheatstone transmitter, the receiving stations having been fitted with fast-writing Morse instruments for the purpose. The transmitters for the three circuits are placed in line, and the punched riband runs from the first transmitter to the second and thence to the third. The arrangement greatly accelerates the transmission, and as the instrument is a recording and automatic instrument the work is much more accurately done than it could be when the bell was employed.

Mr. Eaton, Mr. Lumsden, and Mr. Johnstone have carried out this arrangement, and have devoted to it great pains and attention.

To towns not included in the above-named circuits, but which nevertheless are served by Wheatstone circuits; the news is also sent through the Wheatstone transmitter.

The Electric company used the automatic instrument under an agreement with Sir Charles Wheatstone which the Post Office has inherited. We have been able, however, in view of our extended use of the instrument, to make a much more satisfactory arrangement with him, which I will describe when I come to treat of the financial results of the undertaking.

I do not know that the Metropolitan Gallery calls for any special comment. The circuits are arranged geographically, as in the Provincial Gallery, and the general arrangements of both galleries are alike. The chronofer, by which Greenwich time is transmitted automatically to about 20 principal towns in the Kingdom, and by which time guns are fired in different parts of the country, is in this gallery. The Metropolitan Gallery during the day is under the general superintendence of Miss Saul, who has several able and diligent assistants, and is herself very able. Miss Day has charge of the staff employed in both galleries in numbering and recording messages prior to transmission, and in sorting them after transmission for the Message Account Branch of Mr. Chetwynd's office.

FEMALE STAFF.

The staff employed in Telegraph Street throughout the day, that is, from 8 a.m. to 8 p.m., is mainly, though not entirely, a female staff. The companies employed a female staff, but we have largely extended the employment of female labour. For many reasons I think it is desirable that we should continue in this course, but looking at the matter from a purely departmental point of view, I think that their employment is desirable on the following grounds :—

In the first place, they have in an eminent degree the quickness of eye and ear, and the delicacy of touch, which are essential qualifications of a good operator.

In the second place, they take more kindly than men or boys do to sedentary employment, and are more patient during long confinement to one place.

In the third place, the wages, which will draw male operators from but an inferior class of the community, will draw female operators from a superior class.

Female operators thus drawn from a superior class will, as a rule, write better than the male clerks, and spell more correctly; and, where the staff is mixed, the female clerks will raise the tone of the whole staff.

They are also less disposed than men are to combine for the purpose of extorting higher wages, and this is by no means an unimportant matter.

On one other ground it is especially desirable that we should extend the employment of women. Permanently established civil servants invariably expect their remuneration to increase with their years of service, and they look for this increased remuneration even in the cases, necessarily very numerous in which from the very nature of their employment they can be of no more use or value in the 20th than in the fifth year of their service.

There must always be in the Post Office proper, and not less in postal telegraph offices, an immense number of duties which can be and are just as well performed by a lad of 18 as by a man of 40; but when the same person continues to perform the same duty from his 18th to his 40th year, it is impossible permanently to resist his claim for additional remuneration; and when he continues to perform it to his 60th year, it becomes equally impossible to resist his claim for a retiring allowance.

Nor would it be possible for long to maintain a rule under which persons employed on certain classes of duties should perforce retire after a short term, say five or seven years of service.

Women, however, will solve those difficulties for the Department by retiring for the purpose of getting married as soon as they get the chance.

It is true that we do not, as the companies did, punish marriage by dismissal. It is also true that we encourage married women to return to the service; but as a rule those who marry will retire, and those only will return whose married life is less fortunate and prosperous than they had hoped.

On the whole it may be stated without fear of contradiction that if we place an equal number of females and males on the same ascending scale of pay, the aggregate pay to the females will always be less than the aggregate pay to the males; that within a certain range of duty the work will be better done by the females than by the males, because the females will be drawn from a somewhat superior class; and further, that there will always be fewer females than males on the pension list.

The female clerks in Telegraph Street are under the charge of a matron, Mrs. Craig, who acted in that capacity for the Electric Company. Following the practice of that company, we provide tea and coffee and bread and butter for them morning and evening. We also provide them with fuel, light, attendance, and culinary utensils, linen, and crockery, &c., for their kitchen and dining room, but they themselves provide their dinner. Their conduct since the transfer, under circumstances of great pressure, and occasionally of some annoyance, has been beyond all praise.

We have extended the employment of female labour in other parts of London, and are extending it, as far as is possible, in the provinces. The following statement will show to what extent females were employed by the companies, and are employed by us.

RETURN showing the NUMBER of FEMALE CLERKS employed by the TELEGRAPH COMPANIES in GREAT BRITAIN and IRELAND immediately prior to the Transfer of the Telegraphs to the Postmaster-General; and the number of Female Clerks employed by the Department in Great Britain and Ireland on the 30th September 1870,—Counter Clerks and Counter Clerks employed solely for Postal Purposes being distinguished in the last Section from those employed as Operators.

Place, District, or Country.	Female Clerks employed by the Telegraph Companies prior to the Transfer.	Female Clerks employed by the Post Office on the 30th September 1870.				Difference in favour of the Department.
		Operators.	Counter Clerks, excluding those employed solely for Postal Purposes.	Counter Clerks employed solely for Postal Purposes.	Total.	
Central Station - - -	*267	466	—	—	466	199
*[Of the Electric Company - 192 " United Kingdom - 30 " London and Provincial 45]						
Instructresses at School -	—	7	—	—	7	7
Eastern Central District -	29	30	35	9	74	45
Offices in other Districts of London.	67	168	4	33	205	138
Total for London - - -	363	671	39	42	752†	389
Liverpool - - -	29	38	—	—	38	} 5
Other Towns in England -	14	10	—	—	10	
Total for England - - -	406	719	39	42	800	394
Ireland - - -	59	87	—	—	87	28
Scotland - - -	14	14	—	—	14	—
Totals - - -	479	820	39	42	901	422

† Since the transfer 20 female clerks have left the service, for the purpose of being married. This would give a total of 30 for the year, and would be at the rate of 4 per cent. per annum. But there is at present an abnormal number of very young girls in the service, so that the rate is at present below the average rate.

MESSENGERS.

The following statement shows the number of messengers employed by the company and by us :—

STATEMENT showing the NUMBER of MESSENGERS employed by the POST OFFICE for TELEGRAPH WORK on the 31st August 1870, and the NUMBER of MESSENGERS employed by the TELEGRAPH COMPANIES prior to the "TRANSFER."

POST OFFICE, 31st AUGUST 1870.			TELEGRAPH COMPANY prior to the "TRANSFER."
MESSENGERS.			
Paid by the Department. (Regular Messengers).	Employed by the Postmasters. (Some are only occasionally employed.)	Total Number of Regular and Occasional Messengers employed on Telegraph Work.	MESSENGERS.
1,434	268	1,702	
337	32	369	
213	11	224	
818	3	821	1,471
2,802	314	3,116	1,471

It was the practice of the companies to pay the messengers at certain stations a rate per message delivered, in lieu of fixed wages. We have extended this practice wherever business warrants it, and the following statement will show the names of the stations at which the practice now prevails, and the rate paid at each.

A RETURN showing the POSTAL TELEGRAPH OFFICES in LONDON and the PROVINCES at which the Messengers are paid a Rate per Message, and the Rate paid in each case.

OFFICE.	Rate paid.	OFFICE.	Rate paid.
LONDON.			
Central Station - - - -	d. 1	Birmingham - - - -	d. 1
E.C. Leadenhall Street - -	0½	Do. - - - -	0½
Temple Bar - - - -	1	Farnborough Station - -	1
Gresham House - - - -	0½	Hull - - - -	0¾
Fenchurch Street - - - -	0½	Leeds - - - -	1
S.E. District Office - - - -	0¾	Liverpool - - - -	1
S.W. District Office - - - -	1	Do. - - - -	0½
Parliament Street - - - -	0¾	Manchester - - - -	0¾
W. District Office - - - -	0¾	Newcastle-on-Tyne - - -	0¾
W.C. District Office - - - -	1	Sunderland - - - -	1
Holborn, Inns of Court - -	1	Wolverhampton - - - -	1

The organisation of the force of messengers was undertaken by Mr. Taylor, who, unfortunately, has since left the Department for other and more remunerative employment. Obviously, careful organisation was required. It would be of little use for the Department to employ the best available means for carrying a message over a distance of 500 miles at the rate of 40 words a minute, if when it left the wire it were to be delayed while the messenger played at marbles or jumped over posts. And, again, it is obviously of importance that special pains should be taken to make the messengers, who, as boys, would, of course, rather be dirty than clean, keep themselves and their clothes in a creditable state. To effect these objects Mr. Taylor prepared the following instructions to the boys.

INSTRUCTIONS FOR MESSENGERS AS TO CONDUCT.

"1. Before being placed on duty as messenger, you will be required—

"I. To make a declaration before a magistrate.

"II. To attend four drills, including instruction in cleaning your clothes.

"A copy of the declaration you will have to make on appointment will be found at the end of these rules.

"2. As soon as you are placed on duty, you must enter your address or place of residence in a register, which will be kept at the office to which you are attached; and this address you are not to change without letting your superior officer know, and correcting the entry in the register.

"3. You will be supplied with the following articles of uniform, viz., a tunic, a pair of trousers, a cap, great coat, belt and pouch, gaiters and boots.

"You are never to appear on duty except in uniform. From the 1st of November to the 1st of April, you are to come to the office and to leave it with great coat and gaiters; but, during the day, you may, with the permission of your superior officer, leave your great coat behind you, in a place provided for the purpose.

"You are strictly prohibited from lending or exchanging any part of your uniform. On your quitting the service it is to be returned to your superior officer; and, meanwhile, any loss or damage to it will be made good at your own expense.

"4. On the first Monday in each month you are to attend at the Head Post Office of your district—unless you belong to the Eastern Central District, in which case you are to attend at the Central Telegraph Station—for purposes of inspection. On these occasions you are to appear in full uniform, including great coat, and you are to bring your book of rules with you.

"5. You are at all times to keep yourself scrupulously clean, and to have your hair short and neatly cut.

"6. You should reach the office 15 minutes before the time appointed for commencing duty. Immediately on your arrival, you are to enter your name, and the exact time of your coming, in the attendance book; and, after that, you are to "fall in" for inspection by your superior officer.

"7. In turn with the other messengers at the same station with yourself, you are to clean the kitchen, or other room set apart for your accommodation. This room must be swept every morning, and scrubbed every Saturday. At every station a canvas suit will be provided for the use of the messenger employed in cleaning.

"8. Any damage to the room, or to its contents, will be made good at the expense of the messengers employed at the station, yourself, of course, included.

"9. If prevented by illness from attending the office, you must let your superior officer know, if possible, before the hour at which the duties commence. You must, at the same time, ask for an order to see the medical officer; or, if too ill to leave home, that the medical officer may come and see you. In ordinary cases, the hour for seeing the medical officer is between nine and ten in the morning; but, in cases of emergency, you may go or send to him at any hour of the day or night.

"10. After you have been one year in the service, you will be allowed a fortnight's leave of absence in the course of the year, without deduction from your wages. In cases of absence from illness, a deduction of one-third will be made.

"11. You are strictly prohibited from making any application on official subjects, except through your immediate superior officer.

AS TO DELIVERY.

"1. On receiving a message, you are to start immediately, and deliver it as quickly as you can—after which you are to return to the office.

"2. If you have two or more messages, you are to deliver each in its turn; but if, from any cause, there is difficulty in delivering one of them, you are to hasten on with the others; after which you are to return to the neighbourhood and make inquiries respecting the message you could not deliver.

"3. In the case of a message addressed to a place of business which is closed for the night, *i.e.*, absolutely closed, where you can get no one to answer the bell, you must drop the message into the letter box, if there is one. If there is no letter box, you must fill up one of the red forms which will be given you, and put it under the door. The time at which you arrive at the place of business must be noted on the cover of the message, which must be given back to the clerk in charge, immediately on your return to the office.

"4. If, after full inquiry, you are unable to deliver a message, you are to return with it to the office, and give it back to your superior officer.

"5. Having once received a message for delivery, you are strictly forbidden to give it, under any pretence whatever, to another messenger.

"6. You are at all times to carry in your pouch some forms on which replies to messages can be written; and you must be careful to give one of these forms to every one to whom you may deliver a message, the answer to which has been pre-paid.

"7. If the answer has not been pre-paid, you are to charge for it at the rate of 1s. for 20 words, and an additional 3d. for every five words, or part of five words; and the amount, whether received in money or postage stamps, you are to pay to the clerk on duty to whom you deliver the answer.

"8. You are, on no account whatever, to write out a message for another person. If the sender of a message declines to comply with the regulations, he must be told that his message cannot be sent.

"9. You are, on no account whatever, to divulge any official information you may derive in your capacity of messenger. Any breach of this rule will be visited with the severest punishment.

"These rules must be signed, in acknowledgment that you have read, and fully understand them.

On the whole, the messengers, considering their numbers and their youth, have behaved very well, much better indeed than I had expected. Prior to the transfer, they appeared to me to be a set of irreclaimable scamps. The furniture and fittings of the rooms which they occupied were dirty and damaged, and their own appearance was anything but creditable. Now they are orderly, and apparently do not greatly object to being compelled to keep themselves clean. Drill has given them a better mode of

walking, and they look and are sharp and active. Of course some of them have been mischievous, and have amused themselves by putting blacking into the tea of other boys, or by putting mice into the pneumatic tubes, or by bathing in the water tank at the top of the Central Station on a hot summer's day. But these are mild pastimes after all, and on the whole the boys have been well conducted.

THE INTELLIGENCE DEPARTMENT.

The Intelligence Department of the Telegraph Companies collected and, as it were, edited the news which it transmitted. The Intelligence Department of the Post Office does not collect and edit news, but it makes all the arrangements for transmission, and in this respect it does much more than its predecessor did, as the number of towns to which news has to be sent and the number of subscribers for news in these towns have been largely increased.

The Press Associations simply collect the news and hand it to the Post Office, which provides for its proper circulation and delivery to their various subscribers. This is not managed by the ordinary method of signalling the names of the addressees, but the Department has made special arrangements whereby the necessity for transmitting the names of the addressees has been obviated. The arrangement now in force is as follows: the Press Association news is divided into a large number of distinct classes of news, such as Reuter's news, General Morning news, Sporting news, Parliamentary news; and the Central Press news is classified under 40 distinct numbers.

Each association furnishes the Department bi-weekly with lists containing the names of any new subscribers they may have obtained, and the different items of news to be supplied to them, alterations in the supply of news to papers already supplied by them, and orders to discontinue the supply of news. The Post Office then instructs the Postmasters of the towns in which the offices of the papers are situated to enter or cancel the names of the papers, as the case may be, under the corresponding headings in the lists which have been supplied to them. In the same manner lists have also been supplied to each station which has to transmit news to other offices. For example, if an order were received from the Press Association to supply the London corn market report to the South Shields Gazette, the Postmaster of Shields would be instructed to enter the name of the Gazette under the heading "London Corn Report" in his list, and the Postmaster of Newcastle would be instructed to enter South Shields under the same heading in his list. The corn report would then simply be sent to Newcastle, headed "Press Association, London Corn," and the Postmaster would find, on reference to his lists, that it had to be transmitted to South Shields; and in the same manner the Postmaster of South Shields would find from his list that it had to be delivered to the Gazette.

The reports of the results of great races, the reports of the results of elections, the reports of parliamentary proceedings (which come from the House of Commons by wire), besides market reports, and reports of speeches in the provinces, are written out in manifold at the various instruments on which they are received, and distributed by the Intelligence Department to the circuits over which they are to be sent to the different parts of the country. The Intelligence Department also looks after the working of the special wires which are leased to certain newspaper proprietors.

The work of the Intelligence Department is very arduous, as it involves a very considerable amount of night duty, is almost always done under pressure, and occasionally necessitates the making of complicated arrangements in distant parts of the country at the shortest possible notice. I cannot speak too highly of the manner in which Mr. Patey has organized this department, or of the patience, good temper, and diligence which he displayed in the period immediately after the transfer, when in the midst of our efforts to effect a satisfactory transmission of news we were continuously harassed by angry and violent complaints from many of the subscribers for news. I believe that our mode of performing the work is now satisfactory to the subscribers.

THE MEDICAL OFFICER.

The medical officer, Mr. Steet, attends daily for two or three hours, to see any members of the male or female staff who may desire to consult him. He also attends those who are absent through illness at their own houses; he exercises a wholesome check upon absentees on the plea of ill health, and he pays especial attention to the sanitary arrangements of the station.

THE WORKSHOPS.

In the workshops the repair and adjustment of instruments is carried on to some extent; but as the bulk of this work is done at the stores in Gloucester Road, which will be hereafter described, I shall defer my remarks on this part of the work for the present. In the workshops are two lathes, by which the ribands of paper for the Wheatstone automatic and Morse printing instruments are cut. These lathes, working nine hours per day, cut 750 coils of Wheatstone and 3,390 coils of Morse printing riband per week. Of this supply the central station consumes 150 coils of Wheatstone and 1,390 coils of Morse riband per week. The two lathes can supply the whole kingdom.

THE BATTERY ROOM AND ENGINE ROOM.

Little need be said of the Battery Room, but that it contains nearly 1,000 batteries of nearly 10,000 calls.

We inherited one engine from the Electric Company; but it was not sufficiently powerful for all the work which we wished to impose on it; it also required some repairs. We have therefore erected another, and having got it into full work, have put in hand the repairs of the old engine, which are expected to be completed in a few weeks.

The foregoing remarks will show, I think, that we have utilised every available inch of space in the Central Station. It is too crowded; and we are now considering whether it is possible to enlarge it, or whether we can arrange for the removal of the tenants, the Anglo-American and Indio-European Companies. It is not desirable that we should incur any great outlay upon it, as when the new Post Office buildings in St. Martins-le-Grand are completed the Telegraphs are to be removed to very spacious rooms in those buildings. Nevertheless, though the building is too crowded, and though the arrangements of the work are on that account, and on account of the peculiar structure of the building, not quite what we could wish, I am told by those who have seen the instrument rooms of foreign telegraphic administrations, that ours are in every way superior. Certainly the scene in the Provincial Gallery during the business hours of a busy day, when the messages are pouring in from every station, when every instrument is at work, when the call bells of the tubes are in constant motion, when the collectors are moving rapidly but systematically from table to table, and when the clerks in charge are passing to and fro, regulating the distribution of the messages, and keeping all the operators to their work, is a scene so full of organised activity and regulated motion that no one could witness it without pleasure.

THE SYSTEM GENERALLY.

The following statement will convey a fair idea of the extent of the system which we have established, as compared with that which was in existence prior to the transfer. I am not as yet able to give an exact statement of the mileage of wire now and the mileage of wire prior to the transfer; but it will readily be seen that the increase in the number of instruments presupposes an increased mileage of wire.

A RETURN OF THE NUMBER OF INSTRUMENTS IN USE, AND SPARE, BELONGING TO THE POST OFFICE, ON THE 31ST OF AUGUST 1870, AND OF THE NUMBER BELONGING TO THE TELEGRAPH COMPANIES PRIOR TO THE TRANSFER.

NAME OF OFFICE.	IN USE.														SPARE.														RELAYS.																																																																																																																																																																																																																																																																																																																																																																												
	Description of Instruments.										Battery Power.				Description of Instruments.										Battery Power.																																																																																																																																																																																																																																																																																																																																																																																
	Wheatstone's Automatic.	Hughes' Type.	Morse.			Bright's Bell.	Magnetic Needle.	Handle.		Single Needle.	A. B. C.	Number of Batteries.				Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds.	Daniell.	Other Kinds

Total Number of Instruments in Use and Spare on the 31st August 1870 - 4,153

Total Number of Instruments in Use and Spare before the Transfer - 1,869

Additional Number under the Post Office - 2,284

But large as the system now is, it will be far larger and afford far more accommodation when the new circuits now in course of formation are completed. The following schedule shows what these circuits are. It includes the additional circuits for Ireland, which will be required in connexion with the new cable from Holyhead to Dublin.

Sections.			Existing Circuits.				Proposed Circuits.				Aggregate No. of Circuits.				Remarks.
From	To		Messages.	Stock.	News.	Messages.	Stock.	News.	Railway.	Messages.	Stock.	News.	Railway.		
Inverness	Edinboro'	-	1A	...	...	...	1	...	...	2	...	...	...	A With intermediate offices.
Aberdeen	London	-	...	...	...	...	1	...	...	1	...	...	...
Dundee	Do.	-	...	...	...	...	1	...	...	3	...	...	...
Edinboro'	Do.	-	2	1	See Glasgow	...	...	See Glasgow	...	...	1	See Glasgow	...	
Newcastle	Carlisle and Dumfries	-	...	...	...	...	...	...	...	...	...	...	...
Do.	Carlisle	-	...	...	...	...	1	...	...	1	...	...	...	This will probably enable us to remove Carlisle from the Leeds and Glasgow Circuit.
Do.	Leeds-	-	...	...	...	...	1	...	...	1	...	...	...	No direct Circuit at present.
* Do.	London	-	3	...	See Glasgow	...	1	...	See Glasgow	4	...	See Glasgow	...	* When this wire is complete it is proposed to divide the Circuit, having Sunderland intermediate, at that place.	
Leeds	York and Hull	-	...	...	...	...	...	...	...	...	...	...	...
Do.	Manchester	-	2	...	...	...	1	...	...	3	...	1	...	Only two direct Circuits at present. To be connected at Hull to a local wire to Grimsby.
Hull and Leeds	Bradford	-	...	...	...	...	1	...	...	1	...	...	...
Leeds	London	-	2	1	See Glasgow	...	1	...	See Glasgow	3	1	See Glasgow	...	No direct Circuit at present.	
Hull	Manchester	-	...	...	...	...	1	...	...	1	...	...	...
Do.	Liverpool	-	...	...	...	...	1	...	...	1	...	...	...
Do.	London	-	3	...	...	...	1	...	...	4	...	...	...	B One with intermediate offices.
Peterboro'	Do.	-	2B	...	...	...	1	...	...	3	...	...	...
Glasgow	Belfast	-	1	...	...	...	1	...	...	2	...	...	...
Do.	Dublin	-	1	...	...	...	1	...	...	2	...	...	...
Do.	Carlisle	-	...	...	...	...	1	...	...	1	...	...	...
Do.	Liverpool	-	2	1	...	...	1	...	...	3	1	...	...	No direct Circuit at present.
Do.	Manchester	-	2	...	...	...	1	...	...	3	...	...	...
Do.	London	-	4	1	1	1	1	1	...	5	2	2	...		
Do.	Manchester	-	1	...	...	...	1	...	...	2	...	...	...
Belfast	London	-	...	...	...	...	2	...	...	2	...	...	...	No direct Circuit at present
Do.	Liverpool	-	...	...	...	...	1	...	...	1	...	...	...
Carlisle	Dublin	-	1	...	...	...	2	...	...	3	...	...	...
Liverpool	Bangor	-	...	...	...	...	1	...	...	1	...	...	...
Do.	Manchester	-	10	...	...	...	3	...	...	13	...	...	...
Do.	Dublin	-	...	...	...	...	...	...	...	...	...	...	...
Manchester	London	-	11	3	1	...	3	1	...	14	3	2	1		
Liverpool	Do.	-	2	...	...	...	1	...	...	3	...	...	...
Dublin	Do.	-	6	5	See Liverpool	...	2	...	See Liverpool	8	5	See Liverpool	...	No direct Circuit at present. Will perhaps need extending to Liverpool.	
Manchester	Doncaster	-	...	...	...	...	1	...	...	1	...	...	...
Do	Bristol	-	2	...	...	...	1	...	...	3	...	...	...
Birmingham	Worcester	-	1	...	...	...	1	...	...	2	...	...	...	Extension to London of a Circuit now forming between Chester and Birmingham.
Do.	London	-	5	...	...	...	1	...	...	6	...	...	...
Do. (Chester)	Do.	-	...	...	...	...	1	...	...	1	...	...	...
Cork	Do.	-	1	...	...	...	1	...	...	2	...	...	...

In forming these new circuits, advantage has been taken of the concentration in the hands of the Department of the independent systems of the different telegraph companies. This concentration has admitted of such a re-arrangement of the wires that circuits which have hitherto followed very roundabout routes, in consequence of the companies having but one, or at the utmost two, trunk routes available, will now be carried by direct routes, with a very considerable economy in mileage, and a corresponding improvement in working. The extent of wire thus set free will be 2,540 miles; but in order to set this extent of wire free 1,331 miles of wire will have had to be erected, so that the net saving of wire from the strengthening of routes will be only 1,209 miles. This, however, is an important result of concentration.

The accompanying diagrams will show the routes of the circuits which will be diverted, the wires which will be set free by the diversion, and the wires which are being erected to effect the diversion. As I have already stated, this scheme has been elaborated with great care by Mr. Winter, the assistant engineer-in-chief.

While these more important works of re-arrangement and reconstruction have been going on attention has been given to the consolidation of the system in other directions. The telegraphic system of this country has been constructed mainly with a view to afford the means of communication between London and the provinces. In some special cases pains have been taken to afford cross-country communication, but as a rule the system has been framed to bring London and the country together. This is only the natural commencement of such a business. Those who are familiar with the history of the Post Office know that it began by establishing communication between London and certain provincial towns, and that cross-country communication was devised by a private individual, who farmed the cross-country posts for upwards of forty years.

The Telegraph Companies naturally thought first of bringing London into communication with the country.

Between the great provincial towns also direct communication has been established; but there are many second and very many more third rate provincial towns having much social and commercial intercourse with each other which have no such direct communication.

There are many instances of this in Mr. Preece's district. My own local knowledge enables me to say that the business relations of Maidstone with Ashford and with Canterbury are such that it certainly ought to have direct communication with those towns. So also should Rochester and Chatham have direct communication with Maidstone on the one side and Sheerness on the other. So also should Canterbury have direct communication with Dover. So also should Maidstone with Tunbridge, Tunbridge with Reigate, and Reigate with Guildford.

I am sure that the establishment of direct communication between the towns which I have named would pay commercially.

Again, we are considering whether it may not be possible in some cases, by the erection of short lengths of wire, to connect circuits which are at present separated, so as to give the stations on them two outlets instead of one, and an alternative route in case of interruption.

This has already been done in some few cases with good effect, but the great majority of the circuits are merely radiating lines, and can afford no help to each other.

A very trifling outlay will enable us to introduce circular instead of radiating routes in a large number of cases.

The submarine system worked by the Department comprises three cables laid between Great Britain and Ireland, and a fourth in course of construction, which will be laid in the course of next month; a cable between England and the Isle of Man, a cable connecting England with Jersey, Guernsey, and Alderney, a supplementary cable between Jersey and Guernsey, and a cable between England and the Isle of Wight. There are also some smaller cables in lakes and rivers.

One of the existing Irish cables was laid in the course of last year, and new shore ends were given to another. When the cable now in course of construction is laid, and the land wires are brought into connexion with it, there will be 21 wires in operation between Great Britain and Ireland. Two of these, however, are allotted by agreement to the American Cable Companies, for the despatch of messages between London and Valencia.

When all the improvements which are in progress have been completed, and they are advancing fast towards completion, I believe that the Telegraph system of this country will be as perfect as it can be made.

THE GLOUCESTER ROAD STORES AND WORKSHOPS.

Prior to the transfer, and immediately after it had taken place, we were compelled by the urgency and magnitude of our requirements to entrust much work to manufacturers which Mr. Culley would have preferred to have given to our own workshops. We inherited from the Electric and International Company an extensive factory in Gloucester Road, Camden Town, and in that factory we now carry on a great variety of operations which make us to a great extent independent of manufacturers. The following description of the work done at the Gloucester Road Stores has been prepared for me by Mr. Johnston.

"The work carried on there may be divided into two classes, viz., that relating to all kinds of apparatus in use in our telegraph offices, and that relating to all kinds of line and construction work. The former is carried on by skilled mechanics, of whom there are about 70, including apprentices, employed; and the latter by workmen especially trained for it, and by ordinary telegraph labourers, of whom the number at present employed is 105. In the first class of work the following are the most important items, viz., the remaking and repair of all kinds of instruments, the manufacture of translator boards, the winding of coils, and the examination and testing of all apparatus supplied by manufacturers under contract with the Department. As regards the repair of instruments, it frequently happens that apparatus which might otherwise have fallen into disuse from wear and tear, or from some electrical defect or other, is made equal to new on being sent into the factory; and there is this important advantage of having an establishment of the kind under the immediate eye of the Department, that the improvements in apparatus which *practical working* has shown to be necessary or desirable can be tested and carried out with the least possible delay, and at the least possible cost. For instance, on a recent occasion it was found necessary to have a number of Morse printing instruments adapted for fast speed, in order to apply the automatic arrangement to the transmission of news over the more important press wires. Under ordinary circumstances new instruments would have had to be supplied; but through the ingenuity of the superintending mechanic in the factory, a fast-speed arrangement was devised applicable to any Morse instrument, and in this way a number of comparatively old instruments were adapted and brought into use for a most important service. In the matter of keys, also, many very important improvements have been effected by the persons connected with these works, which could only have been done by persons having the means of watching the *practical* defects of existing apparatus. Since the Department acquired the telegraphs, there has been added to the work carried on at the factory the repairs of the Hughes' type printing instrument. Hitherto, it had not been considered practicable to repair these instruments in this country. Now, however, it is found possible not only to repair, but to improve in some of the mechanical details, this class of instrument; and thus a considerable expense is avoided, as compared with sending them abroad for repair. The manufacture of 'translator boards,' i.e., an arrangement for relaying the current at an intermediate station on to more distant stations, is a kind of work which could not well be done elsewhere than at a departmental factory, seeing that the different arrangements of translators are determined by peculiar circumstances connected with the circuits to be dealt with, and that the whole operation from beginning to end requires the careful inspection of one of the practical officers of the Department. The winding of coils is one of the most important operations connected with telegraphic manufacture. So important is it, indeed, that we do not trust *any* manufacturer of instruments with this part of the process, and all single needle instruments are therefore supplied with the coils unwound. The object is to have the best quality of wire, or, at all events, wire that has been carefully *tested* by our own standard, and to have the winding operation performed with such care and regularity that the requisite quantity can be got on the coil; and this object, we find, can only be accomplished by having the work done under our own eye, so to speak. It is important, and it may be interesting to state here that the wire is, as far as possible, drawn from the copper deposited in the 'Daniell's' batteries, by which means we not only secure the use of a metal as nearly as possible absolutely pure, but are enabled to utilize in a most important branch of the work what we might otherwise be compelled to dispose of at a great disadvantage. The examination and testing of apparatus supplied by manufacturers under contract with the Department, and, indeed, the examination and testing of all kinds of apparatus either made or repaired at the factory itself, is of the utmost importance for the well-working of the system.

"The second class of work carried on at the factory embraces the testing and fitting of insulators; the preparing of arms; the taping of new, and the re-taping of old gutta percha wire; the making up of cables for street and tunnel work; the manufacture of solder; the fitting of new, and the cleaning and re-fitting of old batteries, and the manufacture of 'carriers' for the pneumatic tubes. The brown earthenware insulator is supplied by the manufacturer in separate pieces, so as to facilitate the process of testing, and to admit of its being put together in the most approved and electrically perfect manner. The most severe electrical tests are applied before putting together, and any piece which does not give the necessary insulation is at once thrown out, the total number of defective pieces in each consignment being afterwards written off the manufacturer's invoice and the price disallowed. In this way, about two per cent. of defective insulators, which might otherwise have been put into use, to the great detriment of the working of the lines, are thrown out, while the putting together of the sound and otherwise perfect pieces is effected in the manner best adapted for the particular kind of work for which they are intended, and with those improvements which experience has suggested from time to time. There are employed

at this particular kind of work from 12 to 20 men, and 2,000 insulators a day can be regularly tested and fitted in the manner described. In the gutta percha wire department we employ about 30 people, 23 men and seven boys, and some idea of the amount of work done may be formed from the statement that there have been made up into cables for street and tunnel work during the past year no less than from 2,500 to 3,000 miles of wire. Our operations in this department are not confined to new wire simply, but all kinds of old wire are sent here for examination, and, if possible, for repair, with a view to further utilisation. For instance wires, which have had to be removed from certain street cables owing to bad working are tested here, the faulty parts cut out, and after being carefully jointed, are made almost as good as new. By this means we make the very utmost of every available inch of wire, and the item of 'old stores' in this particular branch is reduced to a minimum. Next in importance is the battery shop, where we employ from 18 to 20 men. The operations carried on here embrace everything connected with the manufacture of batteries, except the making of the mere wooden trough in which the plates and solution are contained. Nothing but the utmost care *in every stage of the manufacture* will ensure a good working battery; and as a good working battery means a good working instrument and a good working line, no pains should be spared to perfect the manufacture in this department. Contract batteries were a source of great complaint in the earlier stages of our experience, and thus we have taken to making nearly all our own. We do the coating with marine glue, we cast our own plates, make our own fittings, and in fact do everything, as I have already said, but make the wooden trough. With our present arrangements we can turn out as many as 250 batteries a week when required, and it may be interesting to state that there have passed through this department during the past year over 11,000 batteries. In addition to the manufacture of new batteries, there is carried on here the cleaning and re-fitting of old ones, and the making up of fresh troughs of the wood of such as have become in other respects useless. The preparing of arms occupies about 15 men, who turn out among them somewhere about 1,500 a day; while in the manufacture of testing boxes, and in the general work of the factory, we employ from six to eight carpenters and joiners. We also manufacture our own solder, apparently a small matter, but one which, in telegraphy at least, is really of very great importance, considering how much the goodness of a wire may be impaired by bad joints here and there, a thing of very frequent occurrence. Amongst the miscellaneous items are the manufacture of 'carriers' for the pneumatic tubes, the forging of light ironwork for the various departments of manufacture, and the distribution of tools and implements of all kinds in use for the purposes of telegraph construction and maintenance. The packing department occupies four or five men constantly, while two coopers are kept fully employed in making old casks into new, and in 'heading' those which are about to be despatched to distant points with stores of different kinds.

"These works, as I have already stated, were occupied for similar purposes by the Electric and International Telegraph Company. They were built in 1858, and, together with a large open yard in the centre of the buildings, cover an area of nearly half an acre. The buildings at the back, adjoining the Camden Dépôt of the London and North-western Railway, are of two storeys high, and embrace the mechanics and carpenters shops, instrument stores, insulator, battery, and wire-fitting shops, and packing shed. Those at the front are of one storey only, and embrace the lacquering shop, testing room, tool store, and general offices connected with the works. Arrangements are being made by the Office of Works for the erection of a three-storey building and basement in place of the present one storey range, to give additional space for mechanics, and for the general purposes of the dépôt. The permanent staff consists of a storekeeper, one principal assistant, and five clerks, a superintendent mechanic, foreman of the yard, and foremen of the various other branches of manufacture and repair, the majority of the men being temporarily employed as occasion requires. The storekeeper, Mr. Bell, has a residence on the premises.

"There is a branch dépôt at Bolton, formerly in the occupation of the late Magnetic Telegraph Company, and held on lease for some years. The work carried on there is chiefly confined to the testing and fitting of insulators on the plan already described as in operation at Gloucester Road, the preparing of arms, and the cleaning and re-fitting of batteries. Stores of various kinds are also kept at Bolton, especially those of the heavier description, iron wire and the like, in order to their more convenient and economical distribution in the northern and north-western divisions of the system. It only remains to add that there are various dépôts throughout the country, such as at Hartlepool, Grimsby, and the like, for the storing and preparing of poles, and that each divisional engineer has one or more local dépôts at the most central and convenient spots in his district for the rapid and economical distribution of stores of the kinds in more general use and demand."

ROYAL ENGINEERS.

By the desire of the Secretary of State for War it has been arranged :

1st. That a body of about 50 men under a commanding officer and two subalterns shall be employed in the construction of the Post Office Telegraphs, and that the subaltern in command of each portion of this force shall be immediately under the control of the Engineer of the Postal Division in which his duty shall from time to time lie, but shall not be under the control of any officer of the Postal Service of a lower grade than that of Divisional Engineer.

2nd. That a further body of about ten men shall be employed as linemen in the maintenance of the Postal Telegraphs, and shall be stationed at such places as may be convenient to the Department. They shall be under the immediate control of the Inspector in charge, under the same conditions as if they were civilians.

3rd. That a body of about 20 men shall be employed as signallers at such Postal Telegraph Offices as may be convenient to the Department, and under the immediate

control of the postmasters of such offices, under the same conditions as if they were civilians.

4th. The commanding officer will have military control of the whole force, whether employed in construction, in maintenance, or in signalling, and may remove any man whose removal shall be desirable for military reasons. He shall also remove any man, whose removal may be required by the Surveyor or Divisional Engineer of the Department because of his inefficiency or insubordination, sufficient notice being given on either side to provide for the performance of the duty entrusted to the man so removed.

5th. That so long as it may be convenient to the Department, the maintenance of the Postal Telegraphs in a certain district shall be entrusted entirely to the Royal Engineer under the immediate control of the Engineer-in-Chief of the Department. A month's notice shall be given on either side, if it is desired by either party, to alter or to put an end to this arrangement.

6th. That the commanding officer shall be himself under the immediate control of the Engineer-in-Chief, as if he were a Divisional Engineer of the Postal service.

7th. That the number of men to be employed, with the manner of their employment, shall be subject to a revision at the commencement of each year, and that the arrangement itself shall be terminable at any time at a month's notice from either side.

8th. That as the Department will not be able to employ a larger force than has been detailed in the preceding paragraphs, after the more urgent works shall be completed, the number of men now engaged shall be reduced, from time to time, as the Engineer-in-Chief may decide, due notice being given to the commanding officer until the limit already fixed has been reached.

The motive for this arrangement and its desirability will be apparent.

SPARE OFFICES.

We acquired from the telegraph companies a large number of offices, some of which we desired to keep, but many of which were useless to us. I forward herewith a paper marked E., showing in detail what we have done with regard to every office thus acquired, and giving the situation of each office, the gross and net rent paid by the telegraph companies for each office, the term of years for which each office held on lease was held, the terms on which each office with which we have parted has been got rid of, and what is being done in the case of any office which we still retain. This paper which fills 50 printed folio pages has been prepared by Mr. Ardron, who has had charge of the duty of disposing of the spare offices, and who has conducted it with great pains and skill.

It will be seen from the abstract of the detailed schedule of buildings and offices which the Department inherited from the late telegraph companies that, exclusive of the numerous stations at which the telegraph companies (more especially the United Kingdom Telegraph Company) transacted their business under an agency or commission arrangement, the number of offices so acquired was 554, and that the nett rent which the companies paid for those offices was 23,725*l.* 7*s.* 0*d.* a year, and the gross rent 30,752*l.* 19*s.* 0*d.* a year.

Of the above number the Department has retained 172, either as telegraph offices or for purposes connected with the engineering department, and for these a nett rent (a portion of the premises being in some cases let) of 9,148*l.* 10*s.* 6*d.* a year is paid. This sum will perhaps appear a large one, but it must be borne in mind that in the larger towns, where the rents are high, we have retained the most important stations of the companies, and heavy rents are in many cases paid for them.

As regards the remaining 382 offices, 320 have been entirely got rid of; 32 have been sub-let either wholly or in part, or the leases have been assigned; 6 are offices which were formerly worked by the Electric Company, but are now stations of the Admiralty, &c.; and there remains an undisposed of balance of 24 only, which owing to the restrictive nature of the leases or because the rents paid by the companies under a competitive system were more than the premises are now worth, or from other causes, we have not yet succeeded in sub-letting or otherwise disposing of, although efforts have continually been made to accomplish those ends. The rents paid for the 23 undisposed of offices amount to 1,715*l.* a year.

The nett rent now paid by the Department in respect of the offices acquired from the telegraph companies is 11,866*l.* 11*s.* 0*d.*, showing a nett reduction as compared with the payment of rent by the telegraph companies of 12,038*l.* 16*s.* a year.

To Mr. Ardron has also fallen the duty of ascertaining and recording in a methodical manner our liabilities in regard to insurances, and rates on buildings, and on wires; and in respect of pole rents and way-leave tents, with respect to which latter liabilities we obtained very little clear information from the companies. Of his labours in this respect I shall have hereafter to treat.

COMPLAINTS.

As a matter of course, we receive complaints from the public. They are not numerous in proportion to the business done, for if every complaint which we receive were well-founded, and this of course is not the case, we have but one complaint to every 600 messages.

I have no means of knowing how many complaints the companies received, but I daresay that we have more than they had. We have a larger system, a larger staff, a much larger number of messages, and it is but reasonable to suppose that we are more liable than they to the faults which arise out of the fallibility of plant and staff. Not above one half of the complaints which we receive are well-founded as against us. In the other half, the fault is proved to be either with railway stations acting for us, or with foreign lines to which we hand over the messages, or with the public themselves. As we collect for and deliver for all the foreign lines, the public charge upon us an immense number of delays and blunders not our own. The war has disarranged the entire telegraph system of the Continent; but complainants are mostly forgetful of this, and constantly ascribe the delays and blunders which quite unavoidably take place on the Continent to the transfer of the English telegraphs to Government. I pointed out to a complainant the other day, that in six out of seven cases the fault had occurred after or before the message left or reached the Government lines. In acknowledging my letter he expressed a hope that Parliament would put an end to such crying abuses as soon as it met.

There is a class of errors which are due not so much to the clerk as to the instrument which he uses. In signalling letters are represented by groups of dots and dashes, and if the instrument fails to convey a dot or a dash, as it sometimes will, or substitutes a dot for a dash, or *vice versa*, as it sometimes will, it may materially alter the message. A gentleman telegraphed from London to his brother in the country to send a *hack* to meet him at a station. The signal for *h* is four dots, and the instrument sent only three dots, which form the signal for *s*. When the gentleman arrived at the station he found a *sack* waiting for him. In this case, however, if he had asked for a *horse* instead of for a *hack*, the blunder would have been corrected, as the receiving clerk would have been able to make nothing of the word *sorse*. Again, a firm in London telegraphed "*Send rails ten foot lengths.*" The signals for *t* and *e* are a dash and a dot, but the instrument sent two dots, which form the signal for *i*; so that the message was delivered thus, "*Send rails in foot lengths.*" In this case, if the senders had been less chary of their words, and had written, "*Send rails in ten foot lengths,*" which would have cost them no more, the blunder would probably have been corrected. The public would help themselves and us very much if they more often wrote legibly, if they used only plain words of ordinary acceptance, and if they were careful always to use the full number of words required to give a grammatical construction to their messages. Taking all these things into account, however, I am forced to admit that we do too frequently commit most annoying and irritating blunders. Telegraph clerks do their work in a very mechanical fashion, and too often have little more care for the messages which they are writing out than a compositor has for the phrases which he puts into type.

On this head I can only say that I am always glad to examine specific complaints, that we spare no pains in investigating them, or in punishing those who are in fault; and that those who have real cause for complaint serve themselves, the general public, and us by stating their complaints specifically. Since the transfer Mr. Brown has had charge of the complaint duty, and has worked at it with much diligence and tact.

It is probable and not remarkable that the complaints in the newspapers against us have been more numerous than those against the telegraph companies. It was useless to complain to the newspapers of the conduct of a joint stock company which was proof against any such attack. A Government Department is more vulnerable and therefore more often assailed, though the assailants have not always more reason.

WORK IN THE TELEGRAPH BRANCH OF THE SECRETARY'S OFFICE.

It is not to be supposed that such a mass of work as that which has been described in the foregoing pages can have been got through without a vast addition to the work of the controlling office. The following statement will give some notion of that work ;

A STATEMENT of PAPERS dealt with in the TELEGRAPH BRANCH of the SECRETARY'S OFFICE during a week in November 1870.

	Papers registered and unregistered.	Letters written to the Public.		Lithographed Forms.
		Number.	Folios.	
Papers dealt with specially - - - - -	917	38	75	0
Papers dealt with in the—				
Extensions Section - - - - -	358	42	62	19
General Correspondence Section - - - - -	1,692	559	839	672
Irregularities Section - - - - -	555	5	11	0
News Section - - - - -	384	48	91	62
Private Wires Section - - - - -	208	15	38	16
Racing Instruction and Schools Section - - - - -	288	3	3	272
Rates, Rents, Taxes Section - - - - -	389	24	73	17
Staff (appointment, pay, and discipline) Section - - - - -	787	52	80	7
	5,578	786	1,272	1,065

Total number of papers dealt with in the Branch	-	-	5,578
On which the number of letters written was	-	-	786
Containing folio pages	-	-	1,272

Note.—Work not classified :—Keeping books of record, preparing statistical and other returns, drawing of maps and plans, and taking shorthand notes.

I am sure that we should not have got through the work in the Secretary's office if I had not even before the transfer introduced shorthand writers. No ordinary staff could have enabled me and the gentlemen who have chiefly assisted me to get through the work in the way in which we have got through it by the help of shorthand writers. It is my firm belief that the aid of shorthand writers quadruples the working power of the chief of a Department. This is, I am sure, a fair estimate. I can compose very rapidly, but I cannot write at the rate of above 30 words a minute. I can dictate at the rate of 140 to 150 words a minute. I had the good fortune to find in the service of the Post Office (which has within its wide fold people who know something of every-thing) three excellent shorthand writers, Mr. Hyde, Mr. Tapp, and Mr. Denman, and for a long time we relied on them only ; but other officers, finding that a knowledge of shorthand was useful, have voluntarily acquired it, and we have also brought some fresh shorthand writers into the service. At first heads of branches took somewhat nervously to the task of dictation, which is a little like speaking in public without the stimulus of publicity, but now they have thoroughly fallen into it.

The following statement shows the work done for us by only four of our shorthand writers in six months of last year.

RETURN of SHORTHAND WORK performed in the TELEGRAPH BRANCH of the SECRETARY'S OFFICE during six months from the date of the Transfer.

—	Number of Cases for the treatment of which Notes were taken in Shorthand.	Number of Pages of Foolscap written half margin covered by the transcribed Notes.	Number of Words.
From February to July -	17,147	16,088	981,140
Average per Week -	659	618	37,736

November 30th, 1870.

In the course of this long account of the work which we were expected to do, of that which we have done, and of the manner in which we have done it, I have endeavoured from time to time to name those who have mainly assisted me. When I come to describe the financial results of the undertaking I shall have to call attention to the assistance which Mr. Chetwynd has rendered in the management of the accounts, and to the valuable labours of both Mr. Chetwynd and Mr. Ashurst (the solicitor to the Department) in regard to our negotiations and arrangements with telegraph and railway companies. On Mr. Ashurst the transfer of the telegraphs to Government has thrown a very large amount of difficult work, and his patience, tact, and professional ability have greatly aided us in the prosecution of our task.

I ought to state here, too, that not only those whom I have named, but many others have in their degree and as they had opportunity, rendered valuable assistance. The officers of the Post Office generally, of all grades, have exerted themselves to carry out the plans of the Department with the willingness and alacrity of which in many previous years I had had abundant experience. The surveyors and the postmasters generally have done all in their power to conciliate the officers transferred from the telegraph companies, and to facilitate the amalgamation of the two services. Nor must I omit to state that the principal officers of the telegraph companies have shown equal alacrity and the same good will. To these gentlemen, I think that peculiar praise is due. They were turned over from one service to another in block, and by no effort of their own. Had they been indifferent to their work, or unwilling to exert themselves, my want of experience of their peculiar duties would have made my position most difficult and painful. They have, however, assisted me in the most loyal, cordial, and friendly manner. They have been led to take this course, partly by their own good feeling, and partly, I doubt not, by the conspicuous example set them by Mr. Culley, who has from the first shown himself to be determined that the Department shall have the full value of his great talents and long experience, and that nothing shall be wanting on his part to make the telegraphic system of this country the most perfect system in the world.

FRANK IVES SCUDAMORE,

Second Secretary.

BRICKLAYER.

- | | |
|--|--|
| 1. Take down and rebuild part of wall dividing Post Office, &c., from the public lobby, according to Plan, and make good plaster, &c. | Alteration of Wall. |
| 2. Remove present external or internal window, or doorway, and frame, and fill up space with inch brickwork in mortar, as shown on Plan, and make good external or internal face. | Remove or block up window or doorway. |
| 3. Take down brickwork and provide new brickwork, and prepare for refixing window or door frame in position, shown upon Plan. Make good plaster, &c. | Remove brickwork for window or door, and prepare for re-fixing the same. |
| 4. Take down brickwork, as shown upon Plan, and provide new brickwork; prepare for fixing new window or door frame, and make good &c. (as per 2nd clause). | New window or doorway. |
| 5. Remove necessary brickwork, and provide and fix wood-brick, or other fastening, for fixing wall-desks or partitions, and ground work. | Provide for fixing wall-desks. |

CARPENTER.

- | | |
|--|---|
| 6. Take down part of partition, shown upon Plan, and make good floor and walls, &c. | Take down part of existing partition. |
| 7. Refix part of partition, as shown upon Plan, and make good, &c. | Refix part of existing partition. |
| 8. Provide and fix part of new partition, as shown upon Plan, to correspond with existing work, and make good old work. | Provide part new partition. |
| 9. Remove desk, table, stamping board, sorting table, &c., and make good floor. | Remove desk, table, stamping board, sorting table, &c. |
| 10. Refix part of desk, table, stamping board, sorting table, &c. | Refix part of desk, &c. |
| 11. Provide part new desk, &c., to match existing work. | Provide part new desk, &c. |
| 12. Provide and fix (and, where practicable, use old materials) a panelled screen, 5 ft. high (shown upon Plan), the upper panels to be glazed with oz. horticultural glass, and fitted with door where necessary. | Screen off enclosure for instrument room. |
| 13. Provide and fix within instrument enclosure an instrument counter, 2 ft. wide, as shown on Plan, and 2 ft. 6 ins. high from floor, with shelves or cupboard under for battery and stores, &c., according to instructions of Surveyor. | Provide and fix instrument counter within instrument enclosure. |
| 14. Screen off, with glazed screen (the upper edge to be 6 ft. at least from the floor of the office) ft. ins. of present counter, as shown upon Plan, and provide | Screen off part of counter and form instrument counter. |
| 15. Remove part of counter, and lengthen same, to form an instrument counter. | Remove part of counter, &c. |
| 16. Provide and fix in position (shown upon Plan) wall-desks, 2 ft. or 2 ft. 4 ins. wide, and 1 ft. 6 ins. deep, and 3 ft. 6 ins. from the ground, of 1½ stuff, and divide by means of screens (glazed with rough thick glass proper for the purpose), made of mahogany or stained deal frames, as directed by the Surveyor, with rounded uprights, as per sketch annexed. | Provide and fix wall-desks for telegrams. |

Screens for counter divisions.

17. Provide and fix No. screens, glazed with rough thick glass proper for the purpose, to be placed 2 ft. or 2 ft. 4 ins. apart, to be made of round mahogany or stained deal uprights, terminated by ornamental knobs, with frame connected with same, as per sketch annexed.

Provide counter flap.

18. Provide new counter flap of same material and make as existing counter, in every way to correspond with same.

Provide Battery Rack.

19. Provide and fix in a rack or open cupboard for batteries, with shelves or racks of inch pine 18 inches apart and of the following dimensions,

PLASTERER.

Make good all walls, ceiling, &c., with plaster.

20. Make good all faces of walls, or ceilings, that have been disturbed, to correspond with existing work.

Lime or whitewash ceilings, walls, &c., where required.

21. Lime or whitewash ceilings, walls, &c., where required, according to instructions of Surveyor.

PAINTER AND GLAZIER.

Paint and varnish counter, desks, partitions, screens, &c. &c.

22. All counters, desks, wall-desks, tables, benches, cupboards, instrument counters, partitions, screens, doors, windows, &c. &c., shown upon the Plan, are to be painted or grained colour, to match existing work, in three coats of best oil-colour, and varnished.

Glazed windows, &c.

23. All windows, doors, &c., shown upon the Plan, are to be glazed where necessary.

Frost windows.

24. Wherever necessary, windows, doors, partitions, screens, &c., are to be frosted to a height required by the Surveyor.

GAS FITTER.

New fittings.

25. Provide and fix necessary new fittings in the following rooms :—

Refix old fittings.

26. Refix existing (or part of existing) fittings, as follows :—

GENERALLY.

Stools.

27. Provide No. stools for the following room

at the value of s. d. each.

Chairs.

28. Also, No. Windsor chairs, for room, of value of 2s. 6d. each, or thereabouts.

Benches.

29. Also, No. yellow deal benches, for room, ft. ins. long, and ft. wide, and ft. high.

Miscellaneous.

30. Also the following miscellaneous items :—

NOTE.—The whole of the above works are to be executed with the very best materials, and in the most substantial and workmanlike manner, and to the entire satisfaction of the Surveyor; and it is to be distinctly understood that no claim for extra work done by the Contractor, above what is included in this Specification, will be entertained, except accompanied by the written order of the Surveyor.

ESTIMATE for Alterations and Additions to be made according to the foregoing Specification and Drawings, and to the satisfaction of the Surveyor.

I

do hereby undertake to make necessary additions and alterations to the Post Office at _____, according to the foregoing Specification and the plans therein referred to, for the sum of £ _____ s. _____ d.; and I hereby agree to execute the said works with the best materials, and in the most substantial and workmanlike manner, and to the satisfaction of the Surveyor of the Post Office.

Name _____

Address _____,

In the presence of - { _____

Date _____ 187____.

Surveyor.

*AN INVENTORY of the Fittings supplied under the foregoing
Estimate, and which Fittings remain the property of the Post-
master-General.*

Surveyor to the Post Office.

Postmaster.

187 ____.

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty,
For Her Majesty's Stationery Office.

NEW WIRE

DIAGRAM

*Showing- 1st The wires set free by the d
2nd The new wires to be erected
3rd The new wires to be erected*

Inverness

GLASGOW

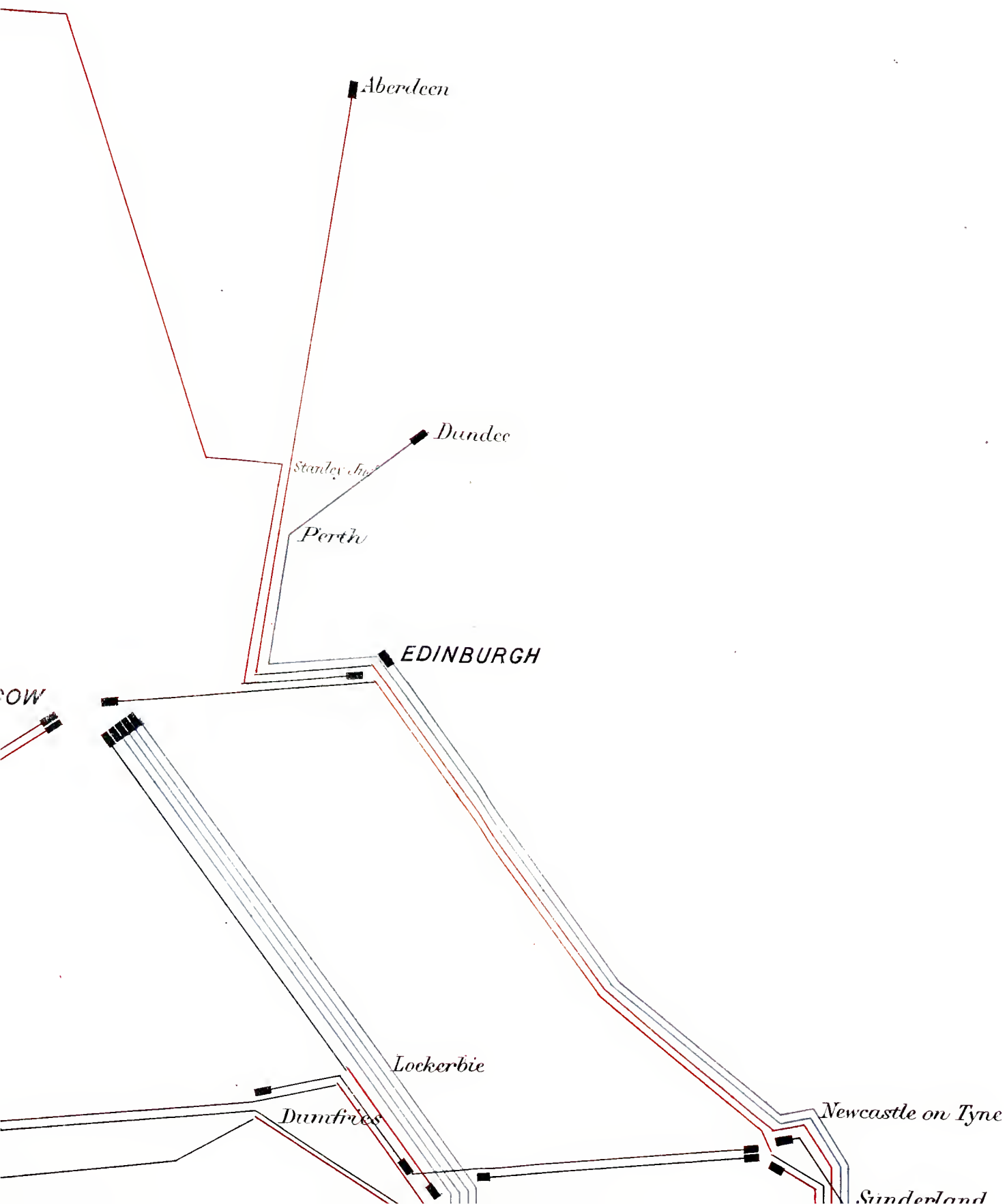
Stranraer

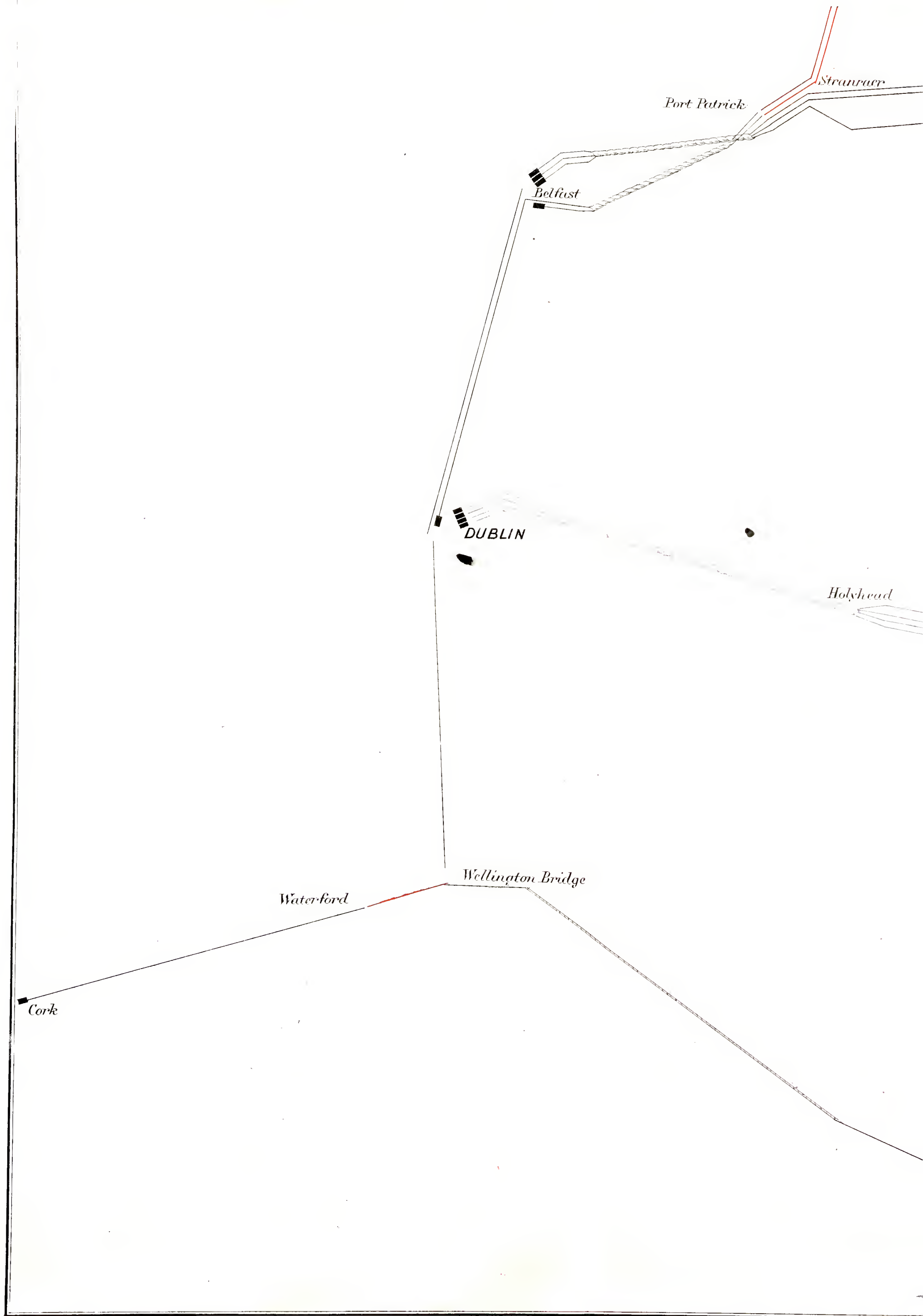
Port Patrick

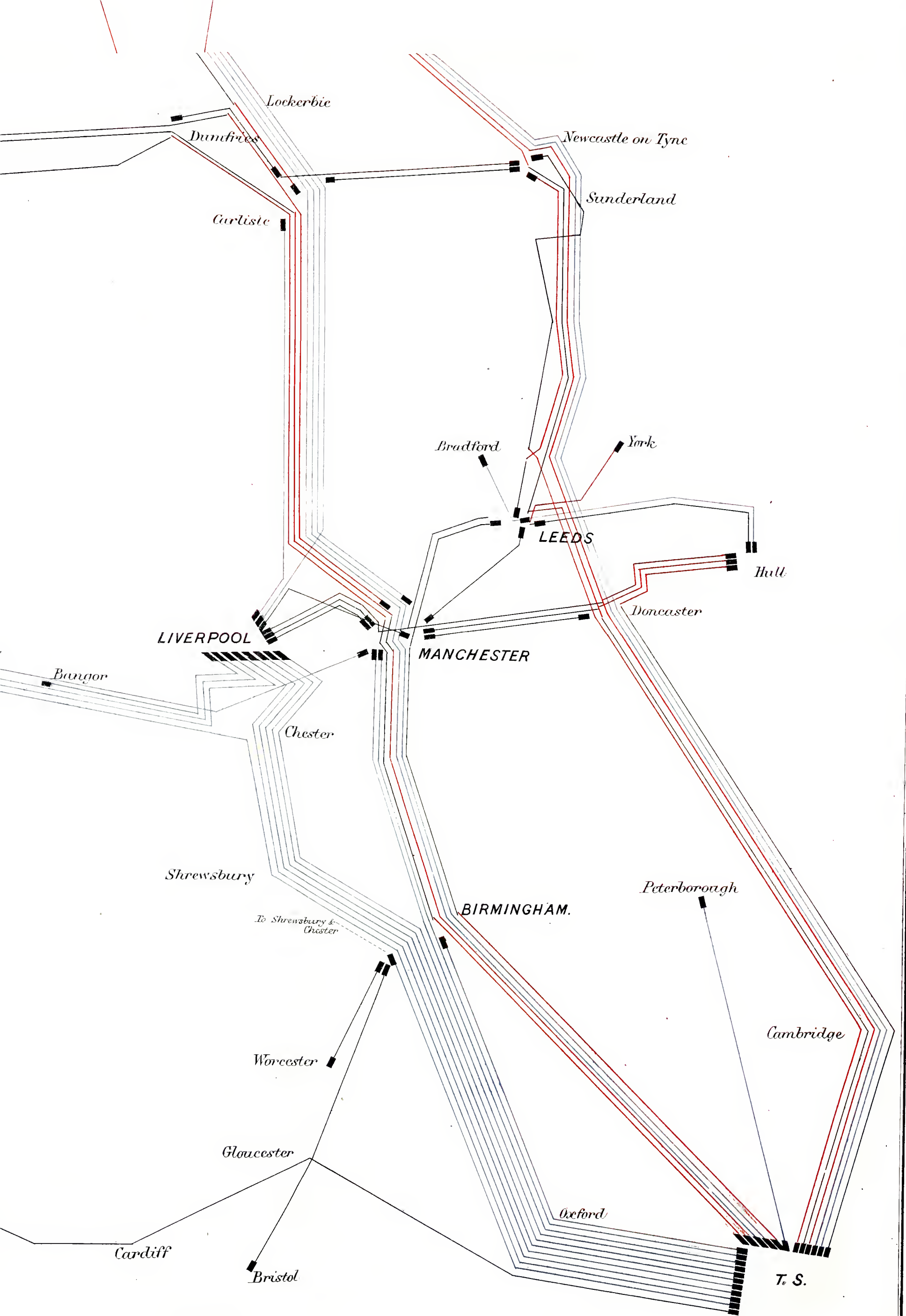
E SCHEME

RAM, 3.

the diversion of the 17 Circuits (black)
ected to utilize the same (red.)
ected to complete the scheme (blue.)





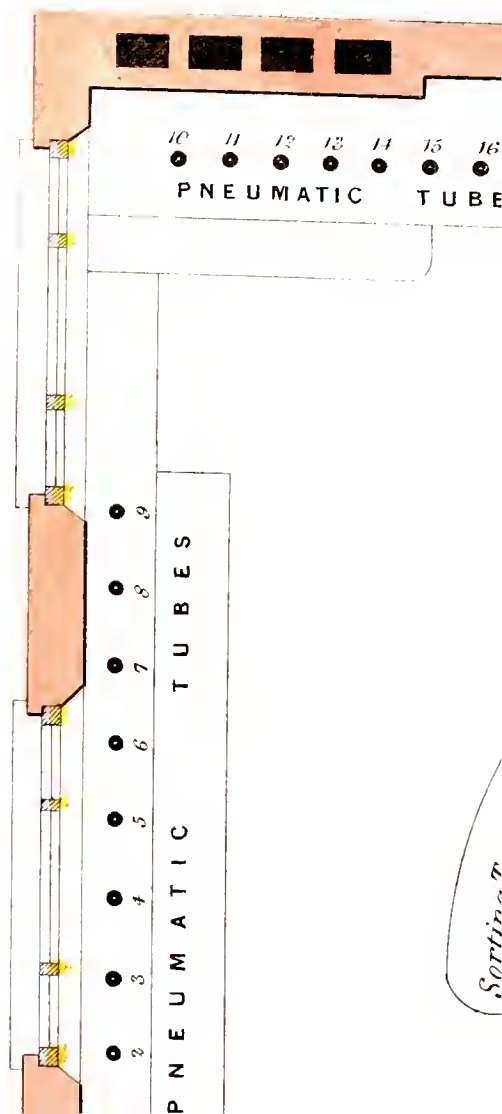


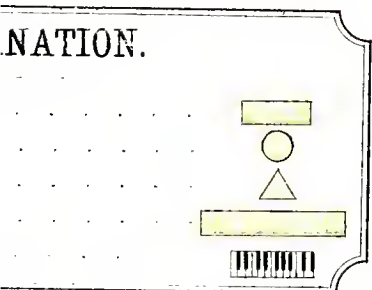
REFERENCE.

1	Chatham.	67	Grimsby.
2	Gravesend.	68	Edinburgh.
3	"	69	"
4	Winchester.	70	"
5	Kingston.	71	Newcastle on Tyne.
6	Redhill.	72	"
7	"	73	"
8	Guildford.	74	Glasgow.
9	Crawley.	75	"
10	Maidstone.	76	"
11	Hastings.	77	"
12	Tunbridge Wells.	78	Manchester.
13	Southampton.	79	"
14	Bury St. Edmunds.	80	"
15	Cambridge.	81	Express News Wires.
16	Ipswich.	82	"
17	Colchester.	83	Manchester.
18	Ely.	84	"
19	Norwich.	85	"
20	"	86	Northampton.
21	Brighton.	87	Rugby.
22	"	88	Hitchin.
23	"	89	Huntingdon.
24	Southampton.	90	Liverpool.
25	"	91	"
26	Portsmouth.	92	"
27	Lynn.	93	"
28	Newmarket.	94	Liverpool.
29	Lowestoft.	95	"
30	Yarmouth.	96	Waterford.
31	Norwich.	97	Dublin.
32	Southampton.	98	Cork.
33	Swansea.	99	Liverpool.
34	Cardiff.	100	"
35	Reading.	101	Dublin.
36	Gloucester.	102	St. Albans.
37	Farnborough.	103	"
38	Newport.	104	Leeds.
39	Falmouth.	105	Bradford.
40	Reading.	106	"
41	Nottingham.	107	"
42	"	108	Liverpool.
43	Leicester.	109	"
44	Bedford.	110	Manchester.
45	"	111	"
46	Bristol.	112	Liverpool.
47	"	113	"
48	"	114	"
49	Bristol.	115	"
50	Exeter.	116	"
51	Plymouth.	117	Bradford.
52	Hull.	118	Leeds.
53	"	119	"
54	Glasgow.	120	Sheffield.
55	Peterborough.	121	Derby.

EXPLANATION.

Morse Printers
Single Needles
Bright's Bells
Wheatstone's Automatic
Hughes' Type Printers





16
TUBES

Sorting Table for Messages received by Tubes

Stairs to
Metropolitan Gallery

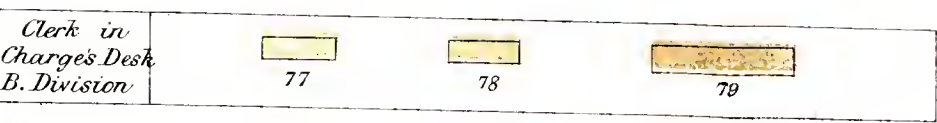
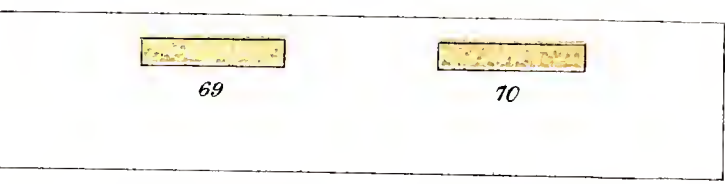
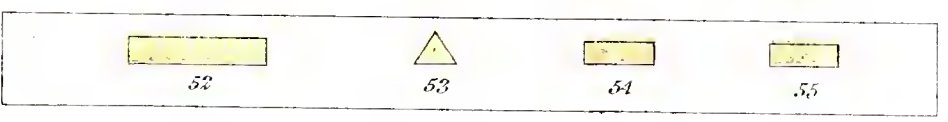
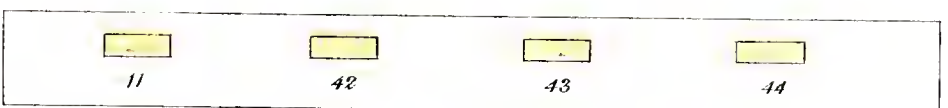
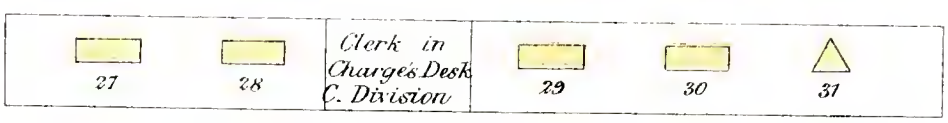
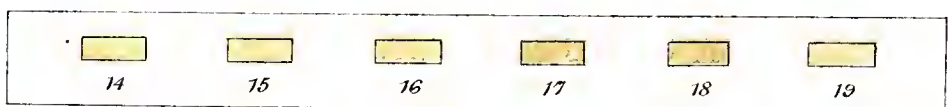
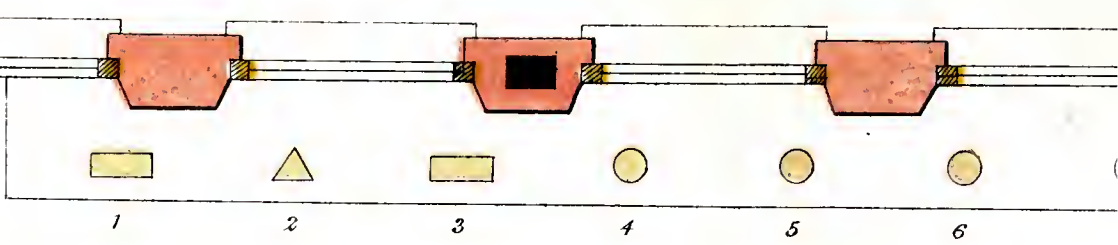
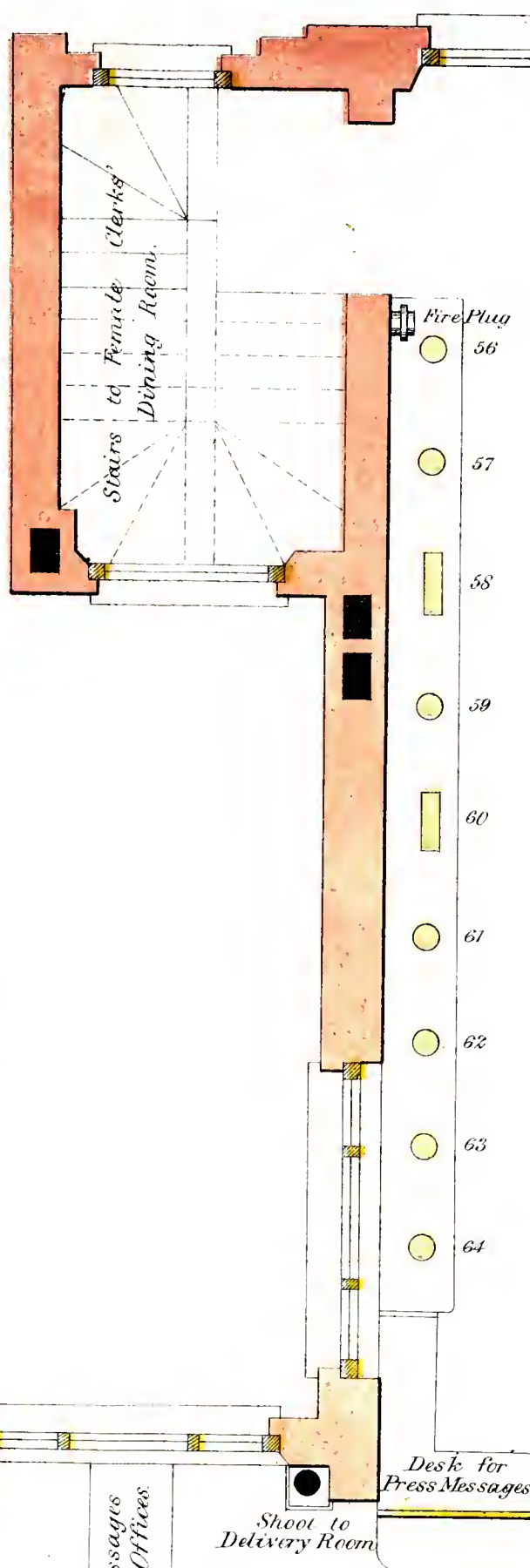
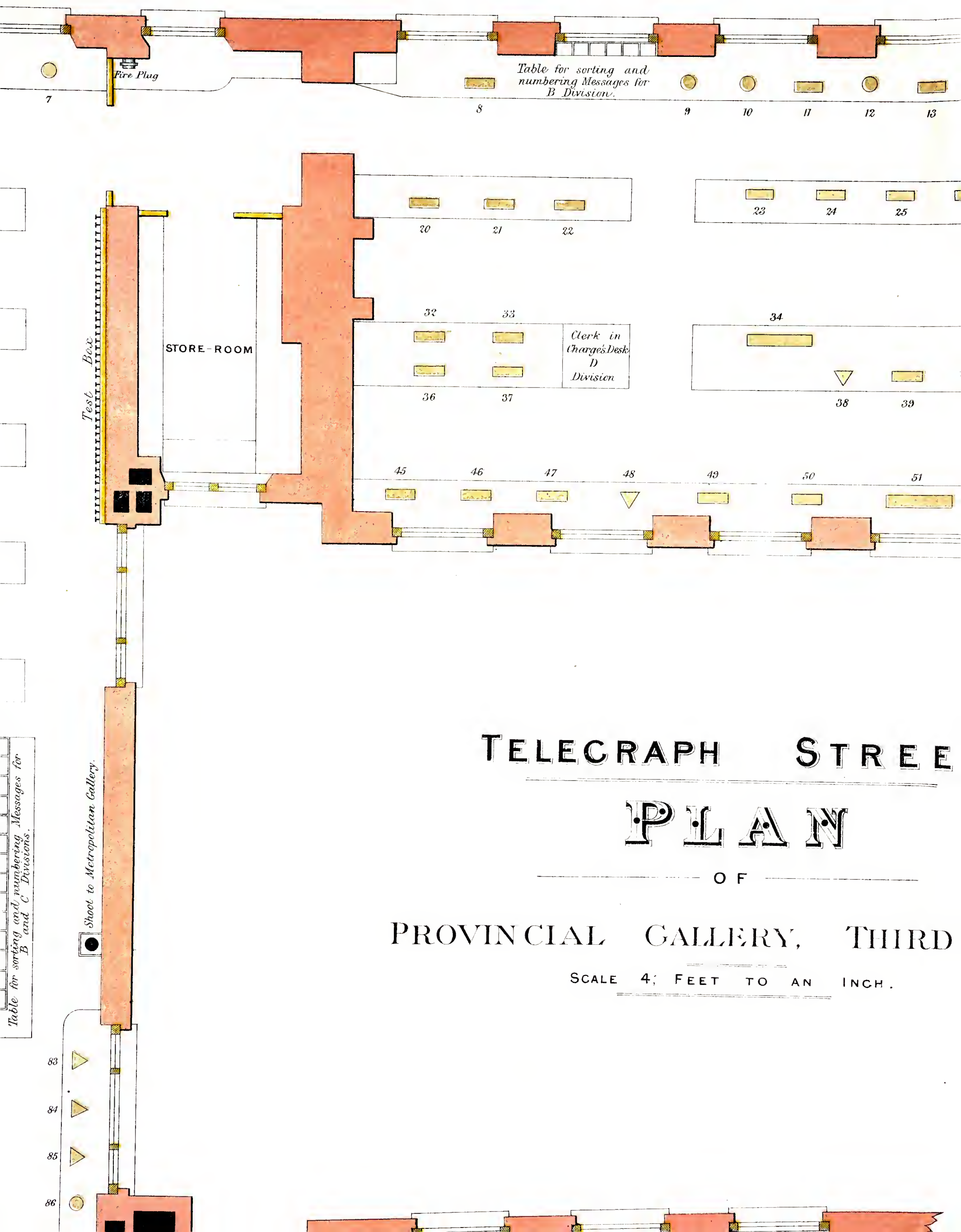


Table for sorting and numbering Messages for B and C Divisions.



Fire Plug

Table for sorting and numbering Messages for B Division.

STORE-ROOM

Clerk in Charge's Desk D Division

Test Box

Shoot to Metropolitan Gallery.

TELEGRAPH STREET

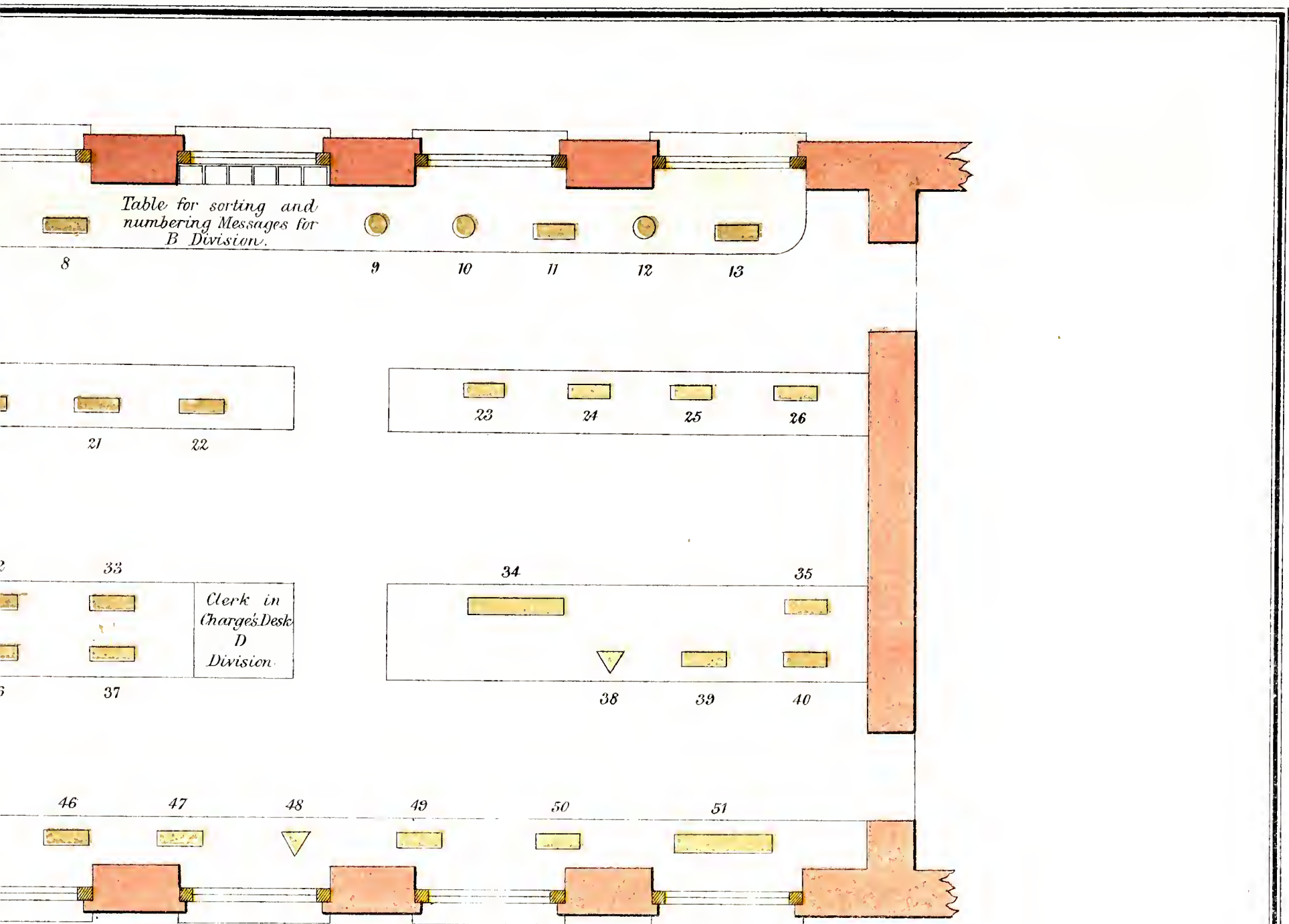
PLAN

OF

PROVINCIAL GALLERY, THIRD

SCALE 4; FEET TO AN INCH.

Table for sorting and numbering Messages for B and C Divisions.



TELEGRAPH STREET.

PLAN

OF

PROVINCIAL GALLERY, THIRD FLOOR.

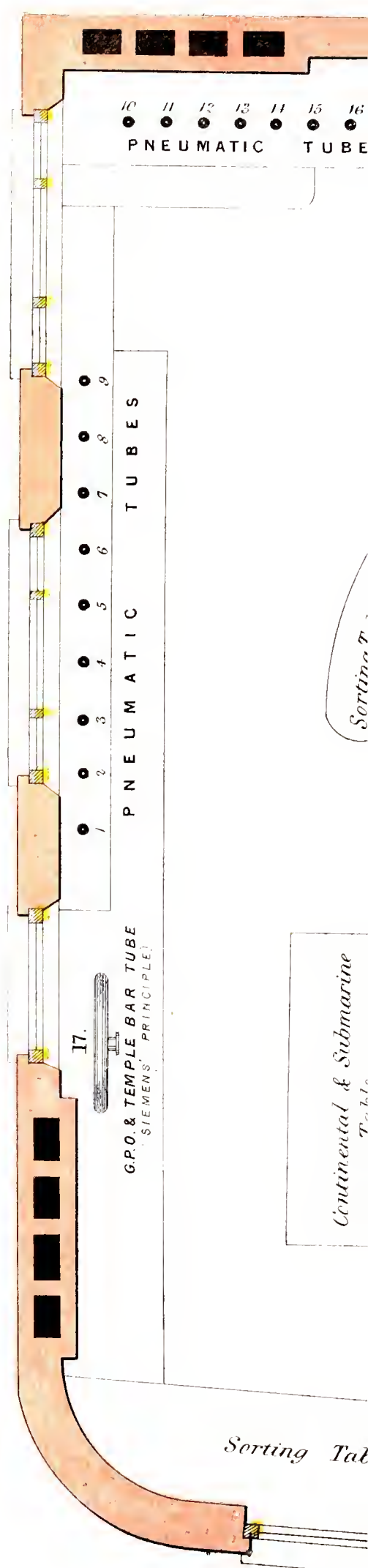
SCALE 4; FEET TO AN INCH.

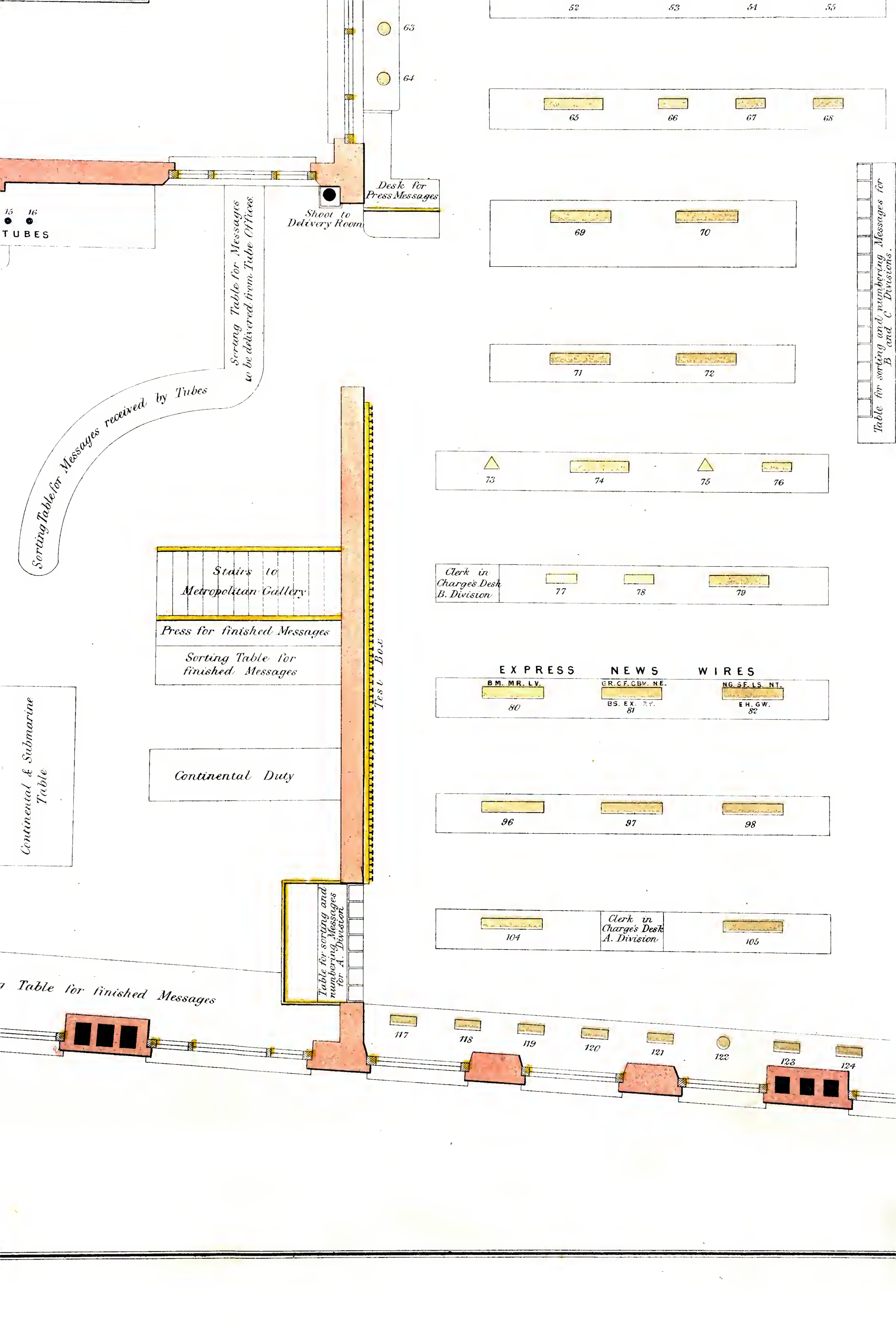
18	Ely.	84	Manchester.
19	Norwich.	85	"
20		86	Northampton.
21	Brighton.	87	Rugby.
22		88	Hitchin.
23		89	Huntingdon.
24	Southampton.	90	Liverpool.
25		91	"
26	Portsmouth.	92	
27	Lynn.	93	
28	Newmarket.	94	Liverpool.
29	Lowestoft.	95	
30	Yarmouth.	96	Waterford.
31	Norwich.	97	Dublin.
32	Southampton.	98	Cork.
33	Swansea.	99	Liverpool.
34	Cardiff.	100	"
35	Reading.	101	Dublin.
36	Gloucester.	102	St. Albans.
37	Farnborough.	103	
38	Newport.	104	Leeds.
39	Falmouth.	105	Bradford.
40	Reading.	106	
41	Nottingham.	107	
42	"	108	Liverpool.
43	Leicester.	109	
44	Bedford.	110	Manchester.
45		111	
46	Bristol.	112	Liverpool.
47		113	
48		114	
49	Bristol.	115	
50	Exeter.	116	
51	Plymouth.	117	Bradford.
52	Hull.	118	Leeds.
53	"	119	"
54	Glasgow.	120	Sheffield.
55	Peterborough.	121	Derby.
56	Newmarket.	122	Berkhamstead.
57	Hertford.	123	Rugby.
58	Margate.	124	Oxford.
59	Ashford.	125	Uxbridge.
60	Dover.	126	Worcester and Hereford.
61	"	127	
62	Faversham.	128	
63	Chelmsford.	129	Birmingham.
64	St. Ives.	130	
65	York.	131	
66	Sunderland.		

PNEUMATIC TUBES.

1	South Gallery.	9	Submarine Coy's Office.
2	Metropolitan Gallery.	10	Leadenhall Street.
3	Indo-European Coy's Office.	11	Fenchurch Street.
4	Anglo-American Do	12	Cornhill.
5	Engineers.	13	Stock Exchange.
6	Lloyds.	14	Lothbury.
7	Baltic.	15	Gresham House.
8	Threadneedle Street.	16	Brit. Indian Coy's Office.

17 G.P.O & Temple Bar Tube





15
•
16
•
TUBES

Sorting Table for Messages received by Tubes

Sorting Table for Messages
to be delivered from Tube Offices

Shoot to
Delivery Room

Desk for
Press Messages

Stairs to
Metropolitan Gallery

Press for finished Messages

Sorting Table for
finished Messages

Continental Duty

Continental & Submarine
Table

Table for sorting and
numbering Messages
for A. Division

Table for finished Messages

Table for sorting and numbering Messages for
B and C Divisions

63

64

65

66

67

68

69

70

71

72

73

74

75

76

Clerk in
Charge's Desk
B. Division

77

78

79

EXPRESS

NEWS

WIRES

B.M. MR. LV.

GR. CF. CBV. NE.

NG. SE. LS. NT.

80

BS. EX. R.V.

81

EH. GW.

82

96

97

98

104

Clerk in
Charge's Desk
A. Division

105

117

118

119

120

121

122

123

124

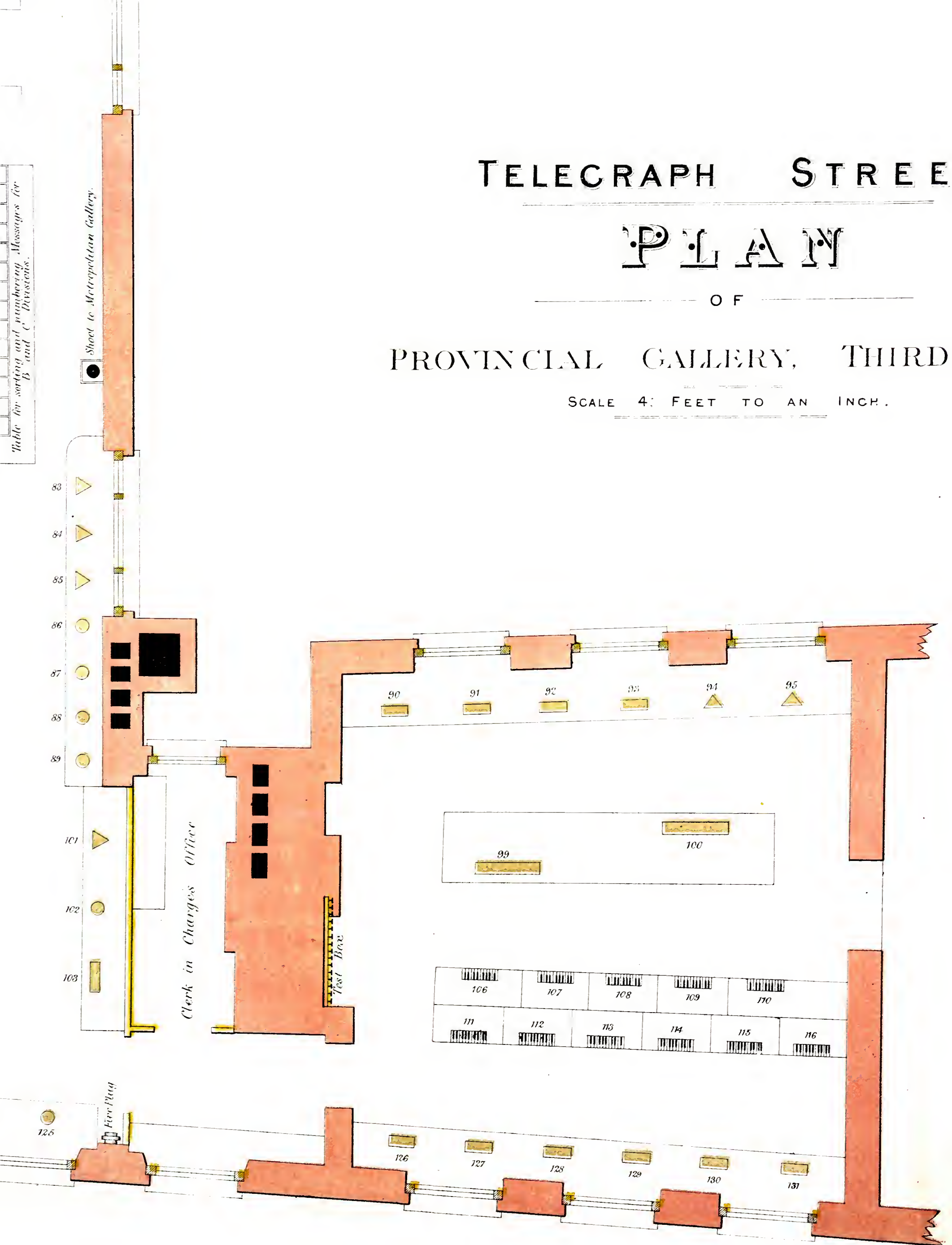
TELEGRAPH STREET

PLAN

OF

PROVINCIAL GALLERY, THIRD

SCALE 4: FEET TO AN INCH.



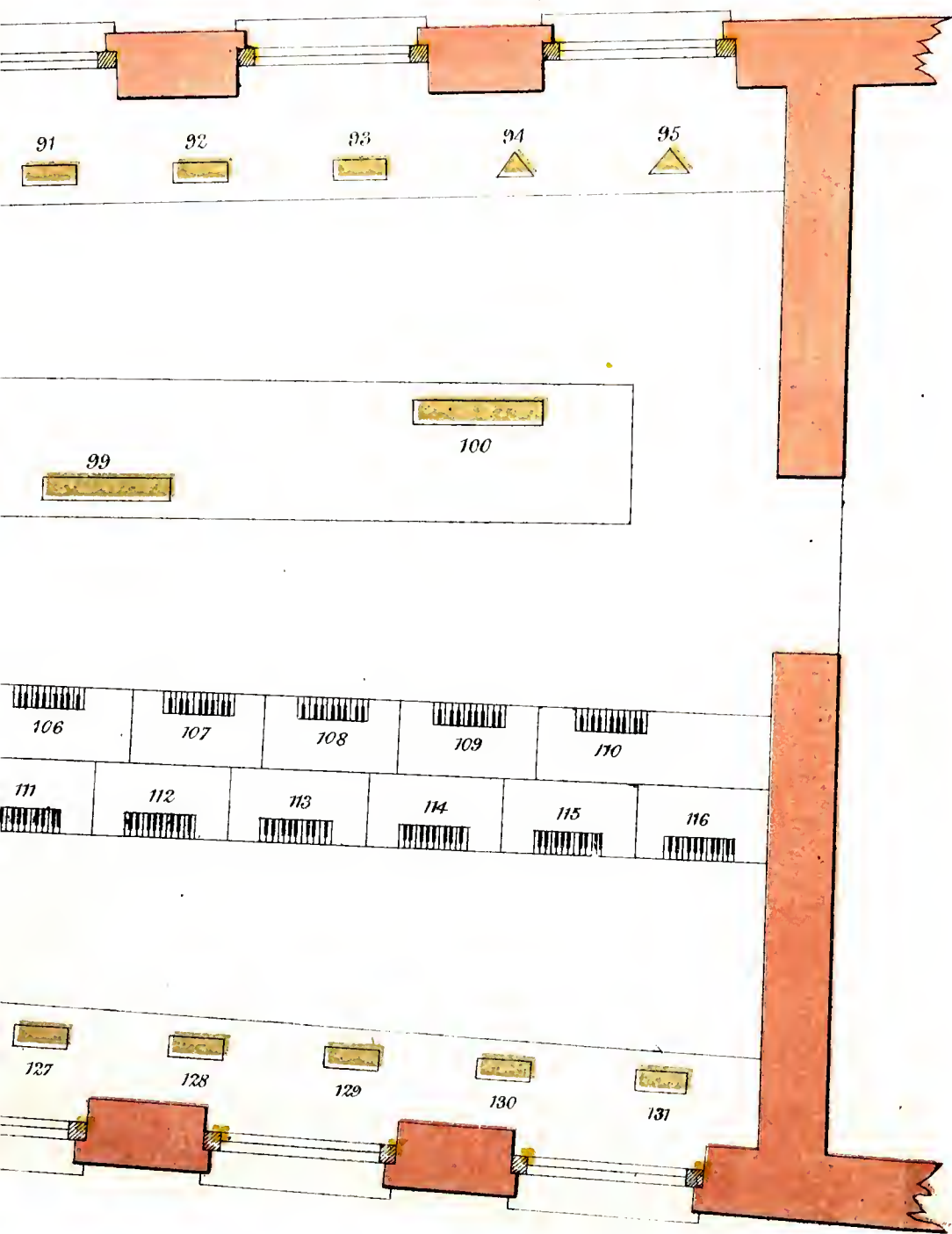
TELEGRAPH STREET.

PLAN

OF

PROVINCIAL GALLERY, THIRD FLOOR.

SCALE 4 FEET TO AN INCH.



Surveyed & Drawn by R. MACKIE.
G. P. O. January, 1871.

REFERENCE.

1	Victoria Docks.	90	Chancery Lane.
2	Shoreditch.	91	Lincoln's Inn.
3	Do.	92	Somerset House.
4	Stratford.	93	
5	Southend.	94	N. D. Office.
6		95	
7	Epping.	96	King's Cross.
8	Mile End.	97	St. Pancras.
9	St. Katherine's Docks.	98	Highgate.
10	Lower Clapton.	99	Islington.
11	Columbia Market.	100	Highbury.
12	Victoria Docks.	101	Poplar.
13		102	Dalston.
14	Ludgate Hill.	103	Cranbourne Street.
15	Coal Exchange.	104	Long Acre.
16	Do.	105	
17	101, Cannon Street.	106	Barnet.
18	Do.	107	Islington.
19	Leadenhall Street.	108	
20	Upper Thames Street.	109	Metropolitan Cattle Market.
21	Clerkenwell Green.	110	Spring Street.
22	Aldgate.	111	Archer Street.
23	E. D. Office.	112	Foubert's Place.
24	Do.	113	Oxford Street.
25	Poplar.	114	Hammersmith.
26	Beckenham.	115	Shepherd's Bush.
27	Smithfield Market.	116	War Office.
28	Covent Garden.	117	Treasury.
29	Bishopsgate St. Without.	118	Treasury.
30	Fleet Street.	119	Admiralty.
31	Store Street.	120	Buckingham Palace.
32	Lombard St. News Rooms.	121	Piccadilly Circus.
33		122	
34	Little Tower Street.	123	
35	London Bridge.	124	Curzon Street.
36	Hop Market.	125	Langham Hotel.
37	Epsom.	126	Kensington High Street.
38	Dorking.	127	Charles Street.
39	Croydon.	128	Potsdown Terrace.
40	Holborn Viaduct, W.	129	Notting Hill Gate.
41	Bloomsbury	130	S. W. D. Office.
42	Temple Bar.	131	
43		132	Knightsbridge.
44	London Bridge.	133	Fulham Road.
45	Borough.	134	Pall Mall.
46	Do.	135	
47	Croydon.	136	Parliament Street.
48	Holborn Viaduct.	137	
49	Holborn Inns of Court	138	Foreign Office.
50	Holborn.	139	
51	Temple Bar.	140	W. D. Office.
52		141	
53	Mark Lane.	142	
54		143	Paddington Railway.
55	Corn Exchange.	144	Paddington.
56	Eastcheap.	145	Edgware Road.
57	Do.	146	Oxford Circus.
58	Gresham Street.	147	Westbourne Grove.
59	Finsbury Square.	148	St. James's Street
60	Camberwell and Vauxhall.	149	
61	Woolwich.		

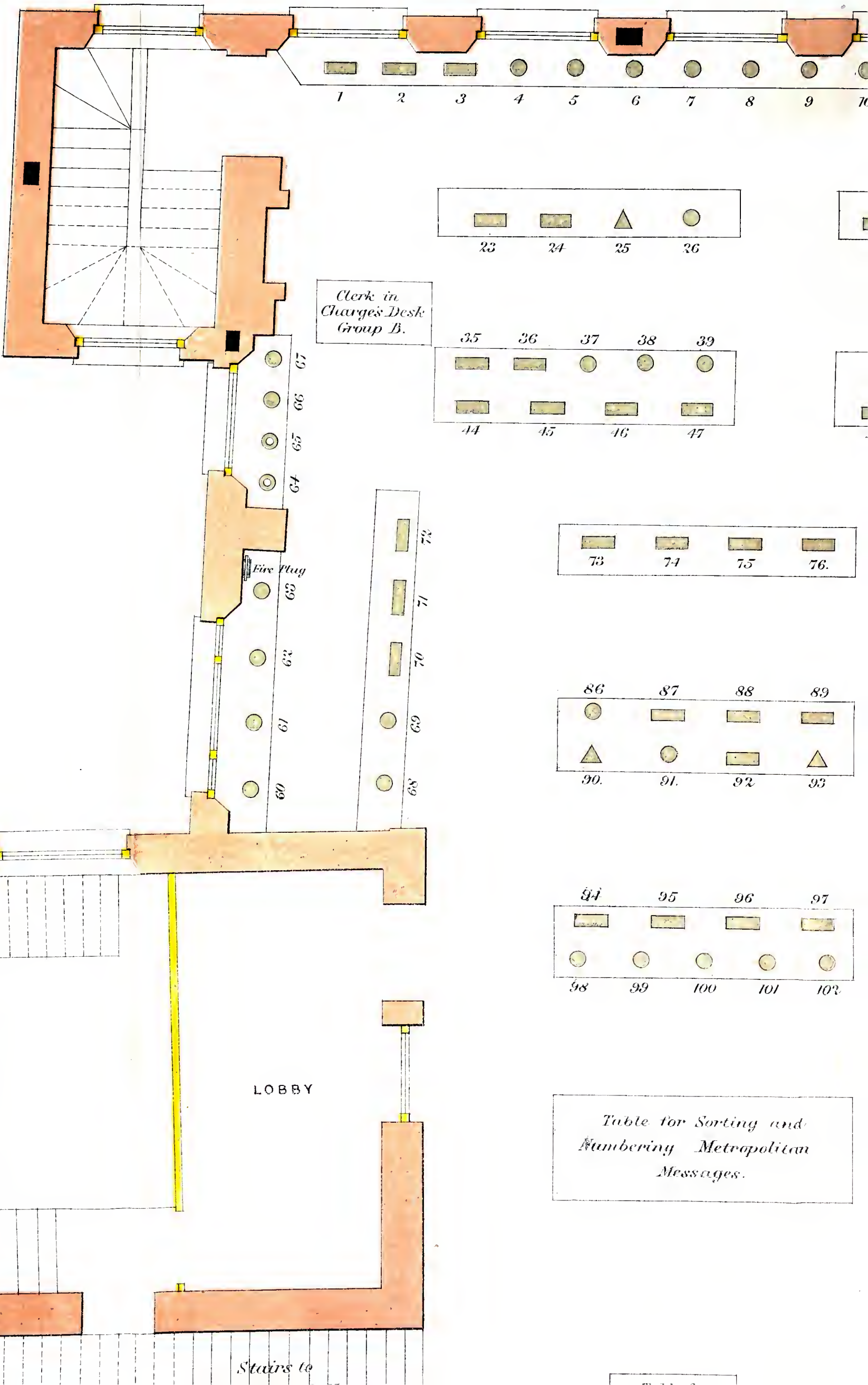
EXPLANATION.

Morse Printers
 Single Needles
 Bright's Bells
 A B Cs
 Double Needle

LAVATORY

NATION.

TORY.

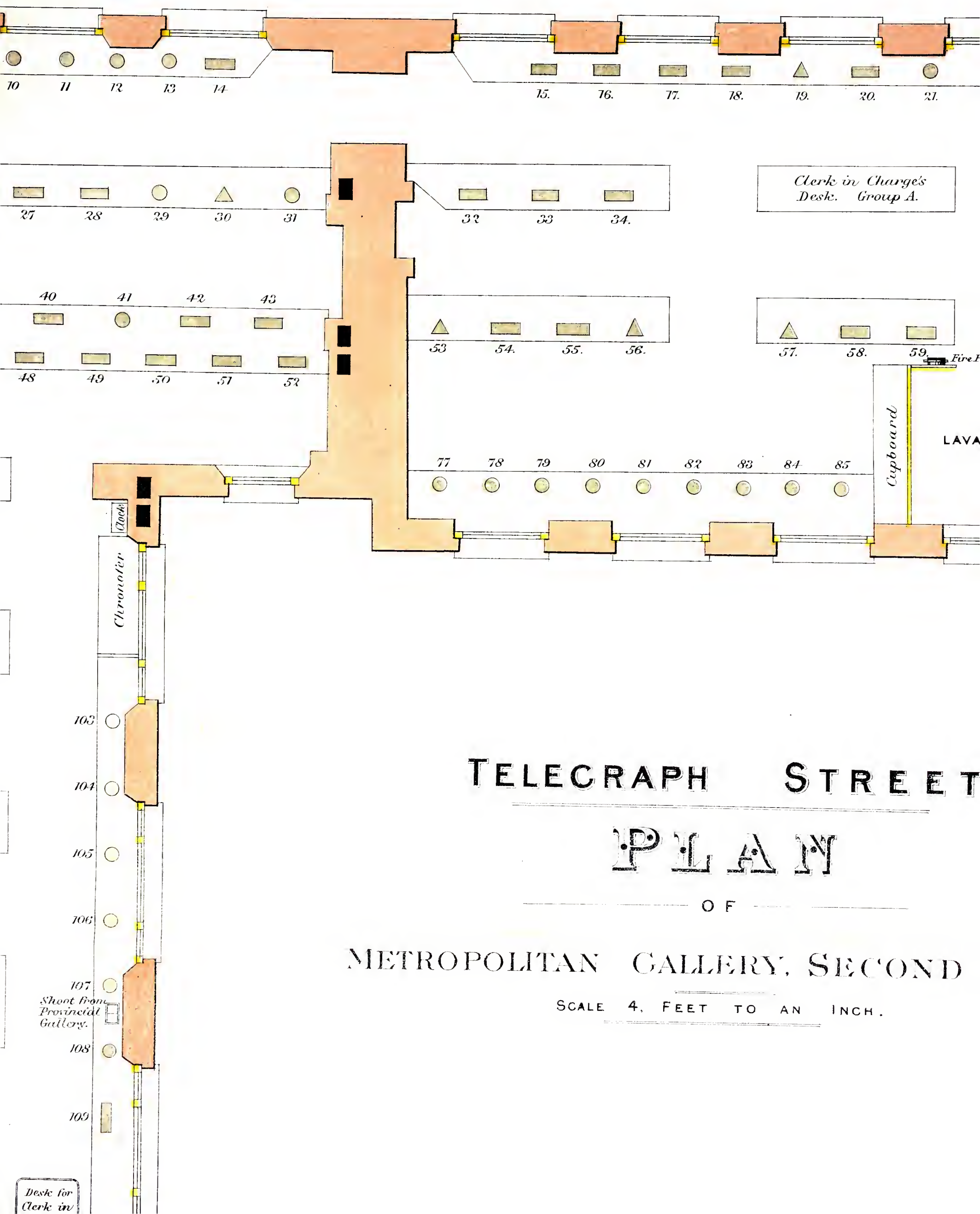


Clerk in
Charge's Desk
Group B.

LOBBY

Stairs to

Table for Sorting and
Numbering Metropolitan
Messages.



*Clerk in Charge's
Desk. Group A.*

LAVA

TELEGRAPH STREET PLAN

OF

METROPOLITAN GALLERY, SECOND

SCALE 4, FEET TO AN INCH.

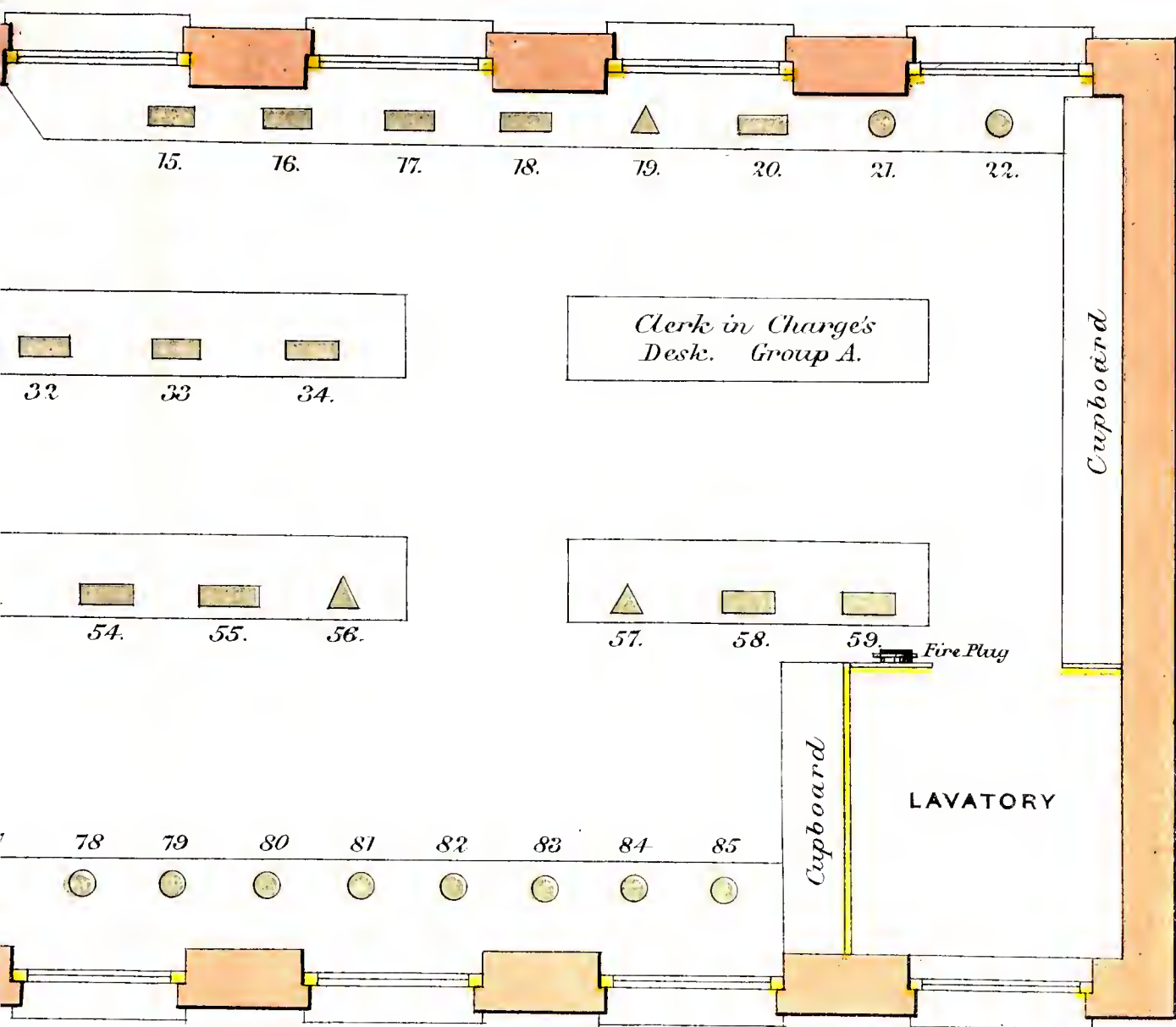
Chronometer

Cupboard

Fire

*Shoot from
Provincial
Gallery.*

*Desk for
Clerk in*



TELEGRAPH STREET.

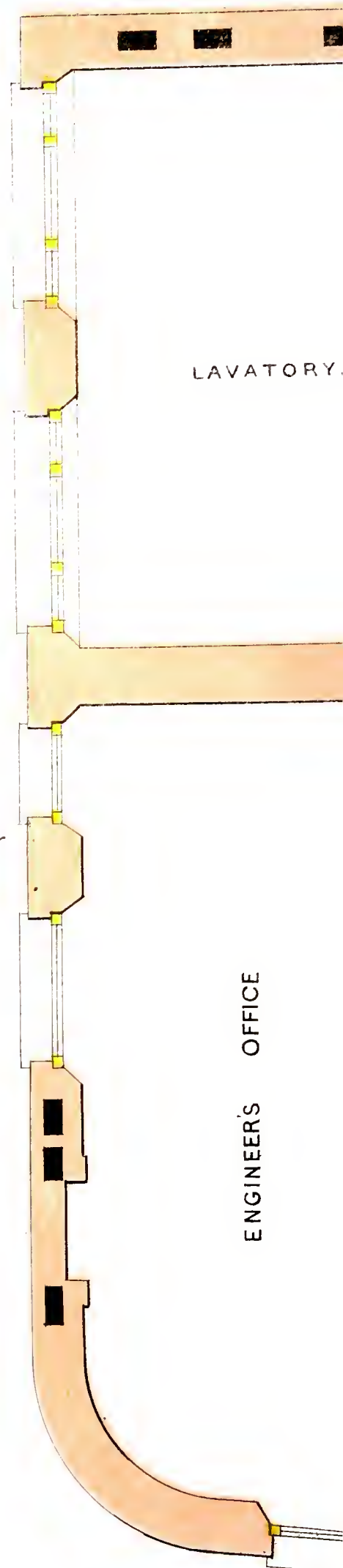
PLAN

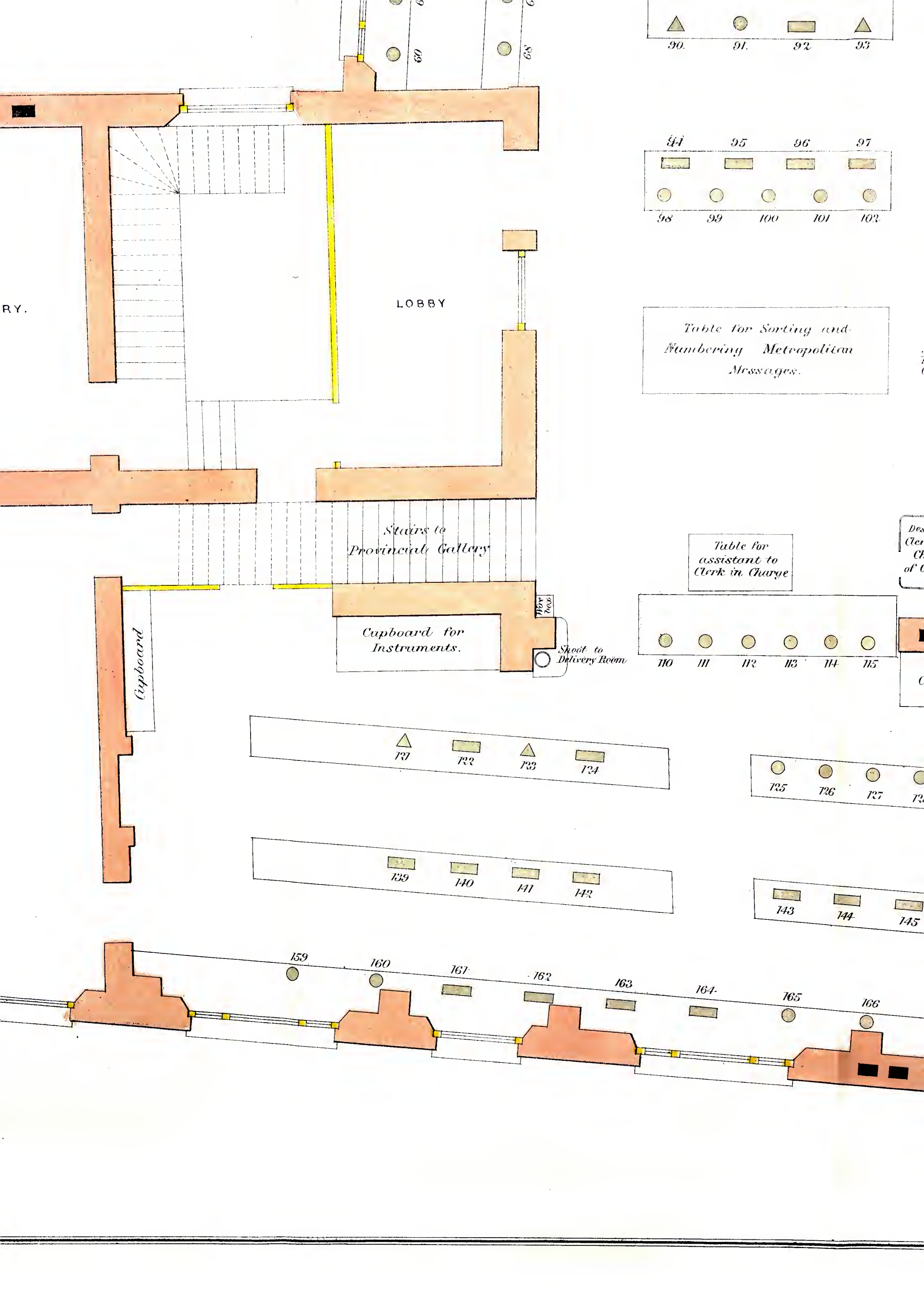
OF

METROPOLITAN GALLERY, SECOND FLOOR.

SCALE 4. FEET TO AN INCH.

29	Bishopsgate St. without.	118	Treasury,
30	Fleet Street.	119	Admiralty.
31	Store Street.	120	Buckingham Palace
32 }	Lombard St. News Rooms.	121 }	Piccadilly Circus.
33 }		122 }	
34	Little Tower Street.	123 }	Curzon Street.
35	London Bridge.	124	
36	Hop Market.	125	Langham Hotel.
37	Epsom.	126	Kensington High Street
38	Dorking.	127	Charles Street.
39	Croydon.	128	Portsmouth Terrace
40	Holborn Viaduct, W.	129	Notting Hill Gate.
41	Bloomsbury	130 }	S. W. D. Office.
42 }	Temple Bar.	131 }	
43 }		132	Knightsbridge.
44	London Bridge.	133	Fulham Road.
45	Borough.	134	Pall Mall.
46	Do.	135	Parliament Street
47	Croydon.	136 }	
48	Holborn Viaduct.	137	Foreign Office
49	Holborn Inns of Court	138	
50	Holborn.	139	W. D. Office.
51 }	Temple Bar.	140 }	
52 }		141 }	Paddington Railway.
53 }	Mark Lane.	142 }	
54 }		143	Paddington.
55	Corn Exchange.	144	Edgeware Road.
56	Eastcheap.	145	Oxford Circus.
57	Do.	146	Westbourne Grove.
58	Gresham Street.	147	St. James's Street
59	Finsbury Square.	148 }	
60	Camberwell and Vauxhall.	149 }	House of Commons
61	Woolwich.	150	
62	Rotherhithe.	151	Do. Do.
63	Blackfriars Road.	152	Churton Street.
64 }	Private Wires.	153	Putney.
65 }		154	Victoria Station (L C & D. Ry.)
66	Forest Hill.	155	Victoria Station (L B & S. C. Ry.)
67	Deptford.	156	Waterloo
68	Crystal Palace.	157	Windsor
69	Lambeth and Kennington.	158	Slough.
70	S. E. D. Office.	159	Eversholt Street
71	Do.	160	Stanmore.
72	Press Association	161	Camden Road.
73 }	West Strand.	162	Haverstock Hill
74 }		163 }	N W D. Office
75 }		164 }	
76 }		165	Upper Glo'ster Place
77	Doctors Commons.	166	Marylebone Road.
78	Coleman Street.	167	Swiss Cottage
79	Seething Lane.	168	Hampstead
80	33, Cannon Street, W.	169	Horse Guards
81	Wormwood Street.	170	Fulham Road
82	Moorgate Street.	171	Westminster Broadway.
83	Wood Street.	172	Westminster Palace Hotel
84	Barbican.	173	Clapham Junction.
85	Goswell Road.	174	Cambridge Street.
86	Red Lion Street.	175	Stockwell Place
87 }	W. C. D. Office.	176	Staines.
88 }			
89 }			





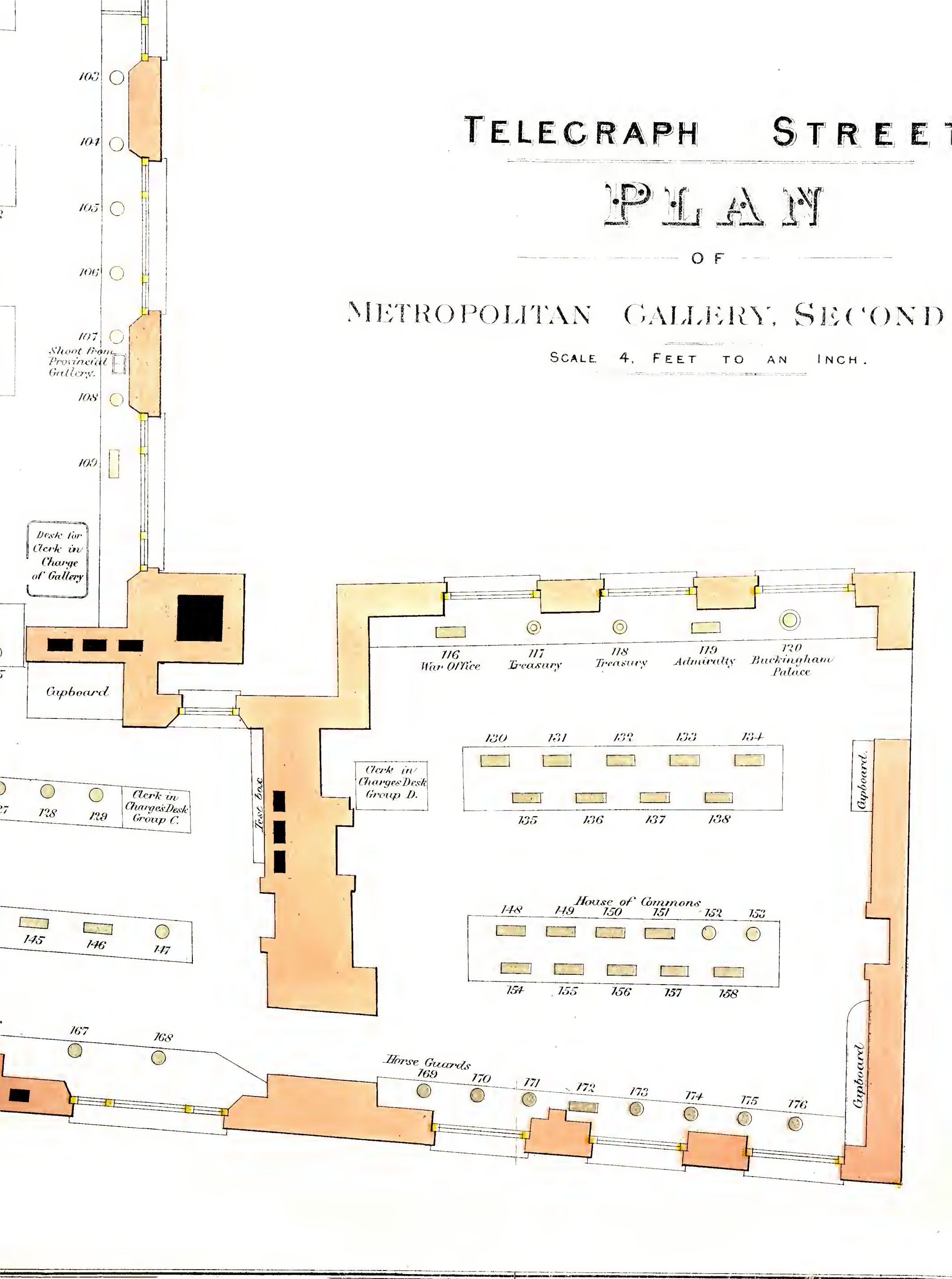
TELEGRAPH STREET

PLAN

OF

METROPOLITAN GALLERY, SECOND

SCALE 4, FEET TO AN INCH.



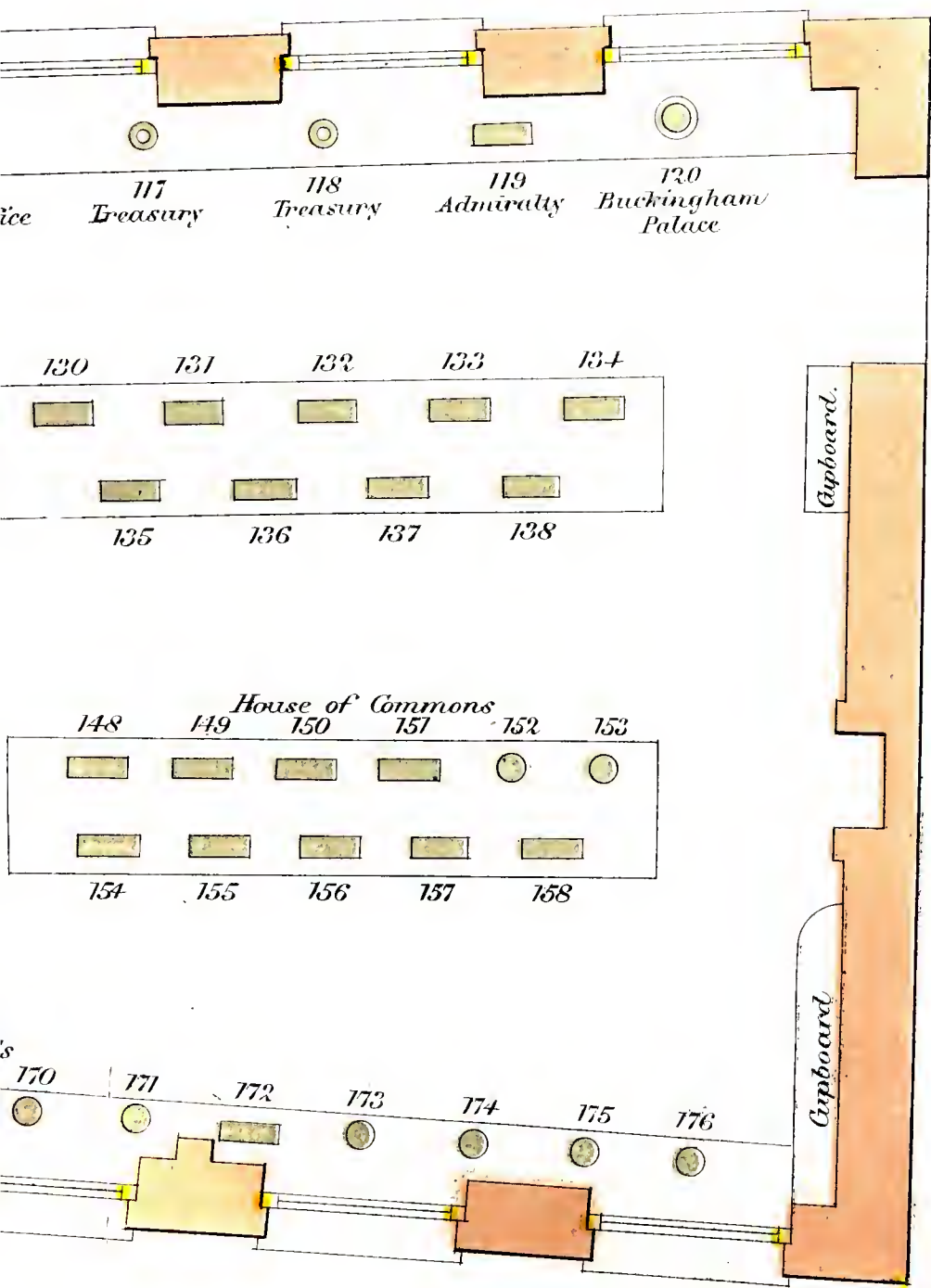
TELEGRAPH STREET.

PLAN

OF

POLITAN GALLERY, SECOND FLOOR.

SCALE 4. FEET TO AN INCH.

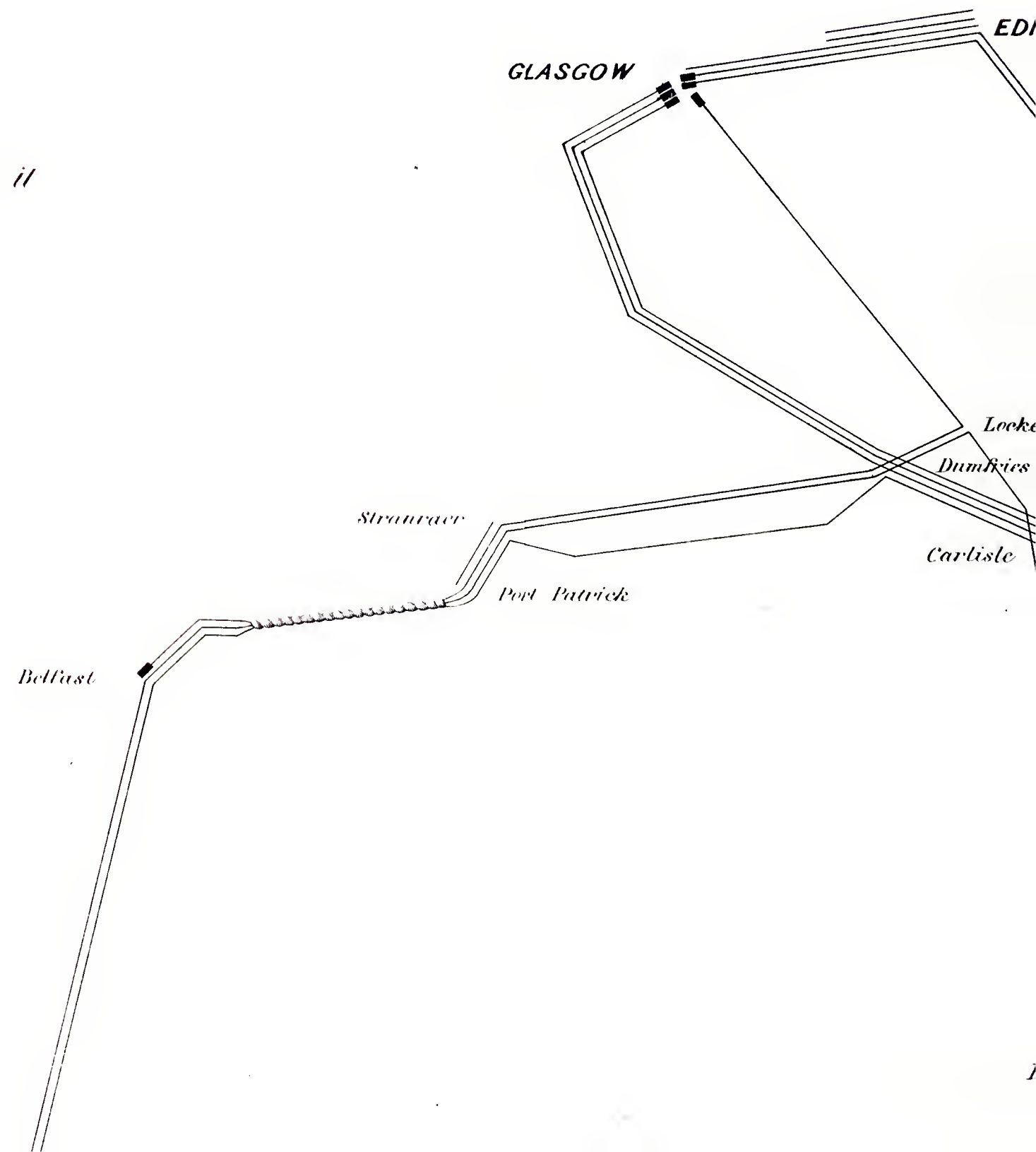


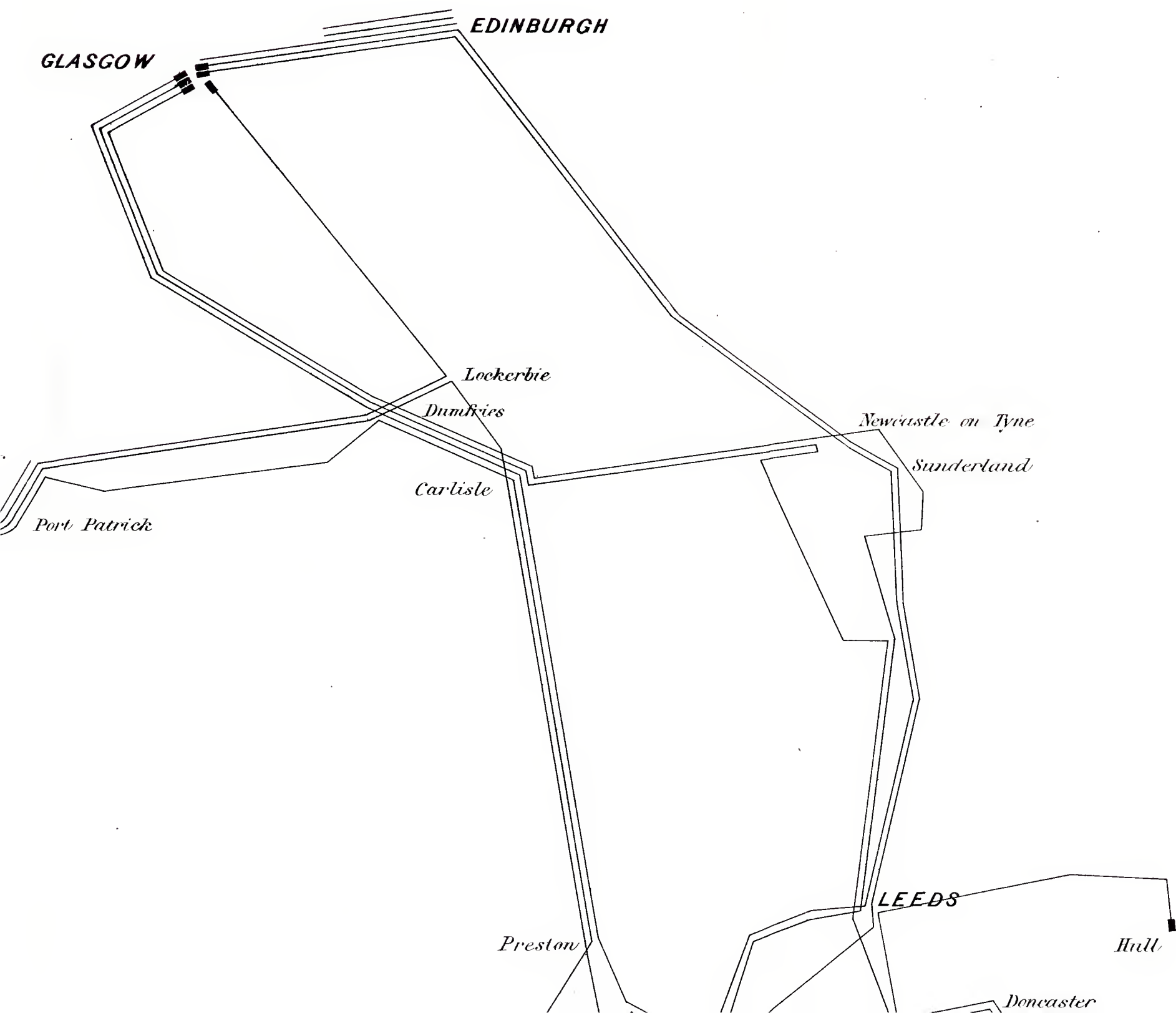
Surveyed & Drawn by W. NOPS,
January 1871.

NEW WIRE SCHEME

DIAGRAM, 1.

Shewing 17 Circuits, at present carried by circuitous routes, which it is proposed to divert by more direct routes.



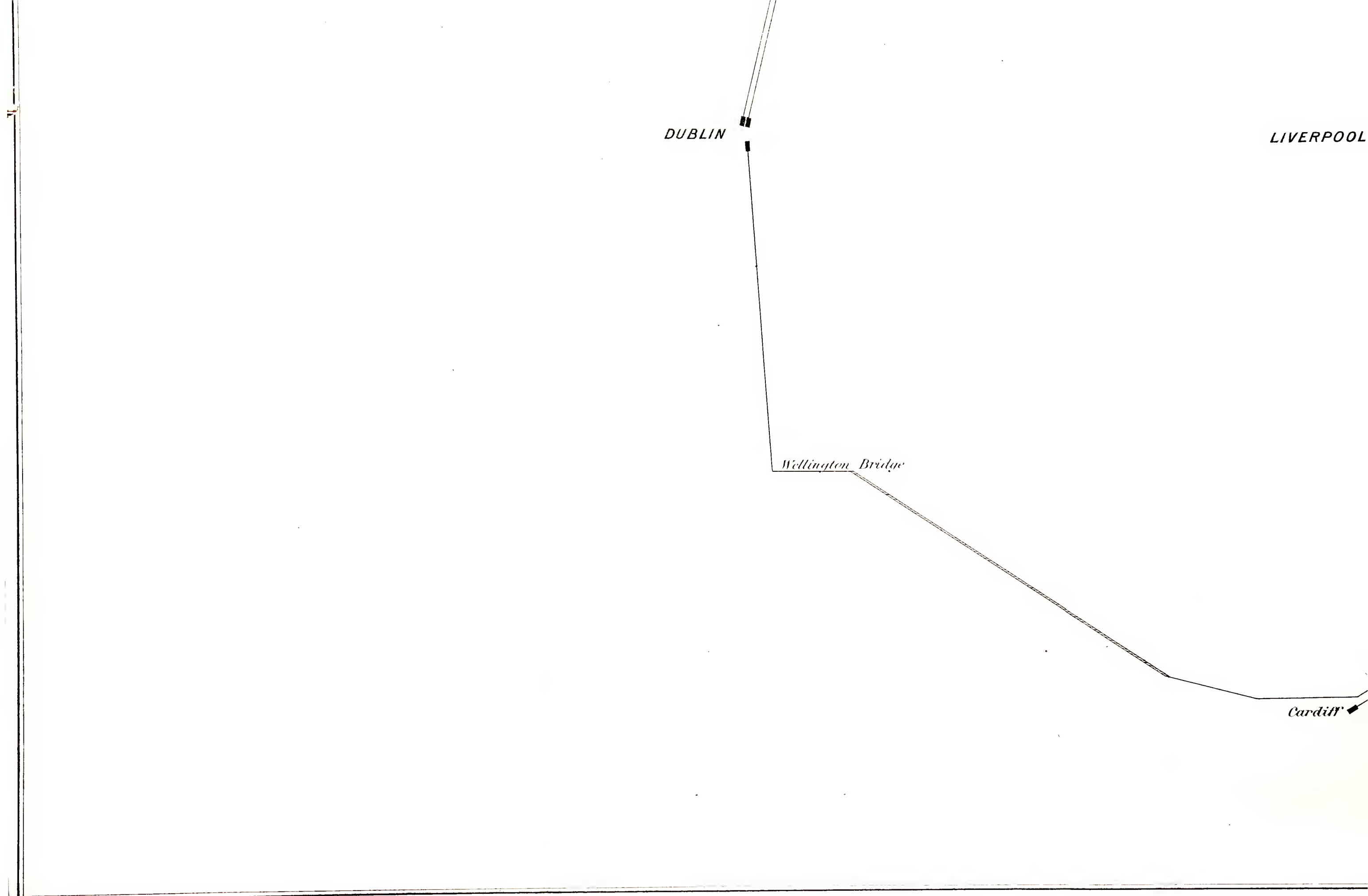


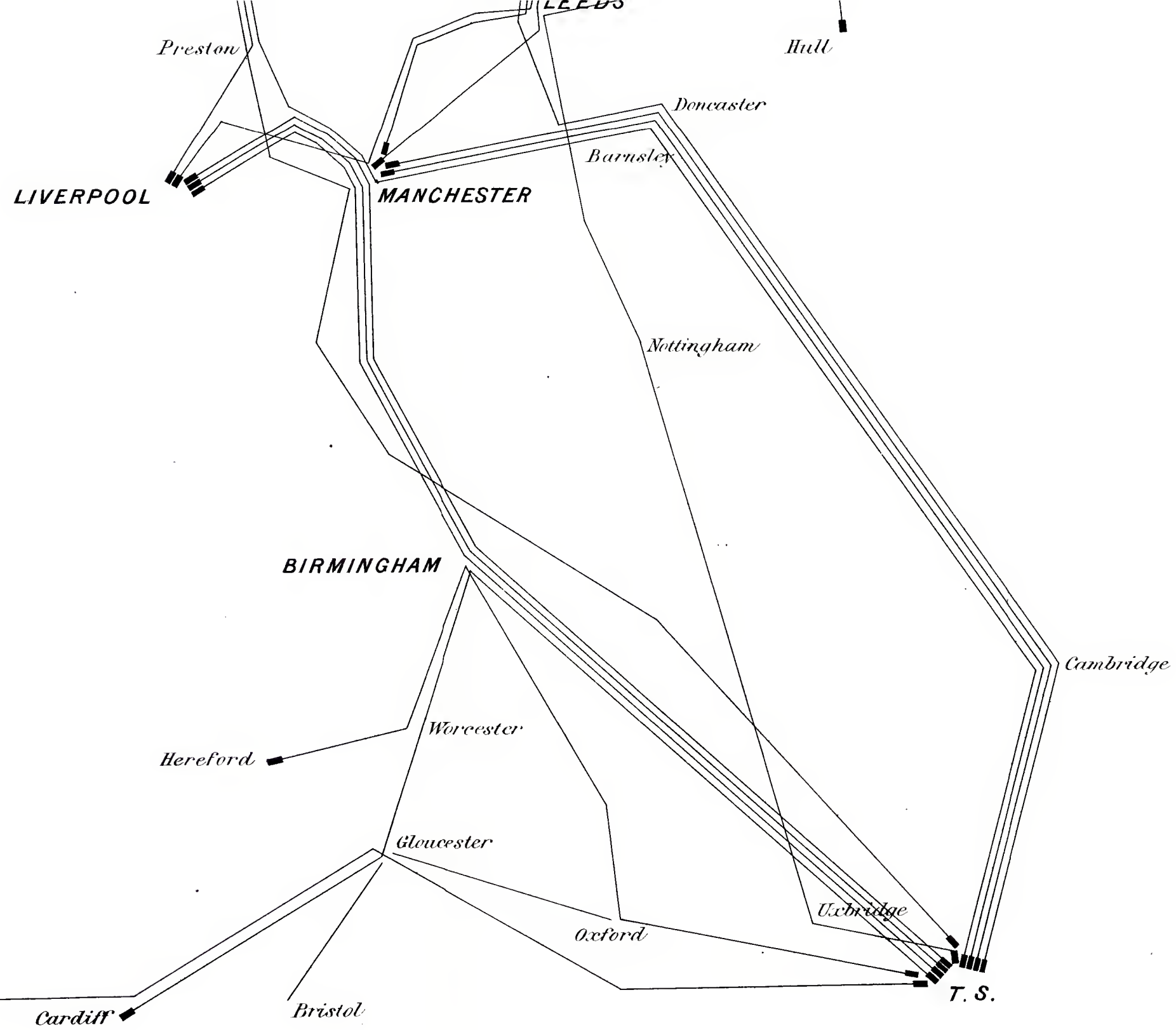
DUBLIN

LIVERPOOL

Wellington Bridge

Cardiff

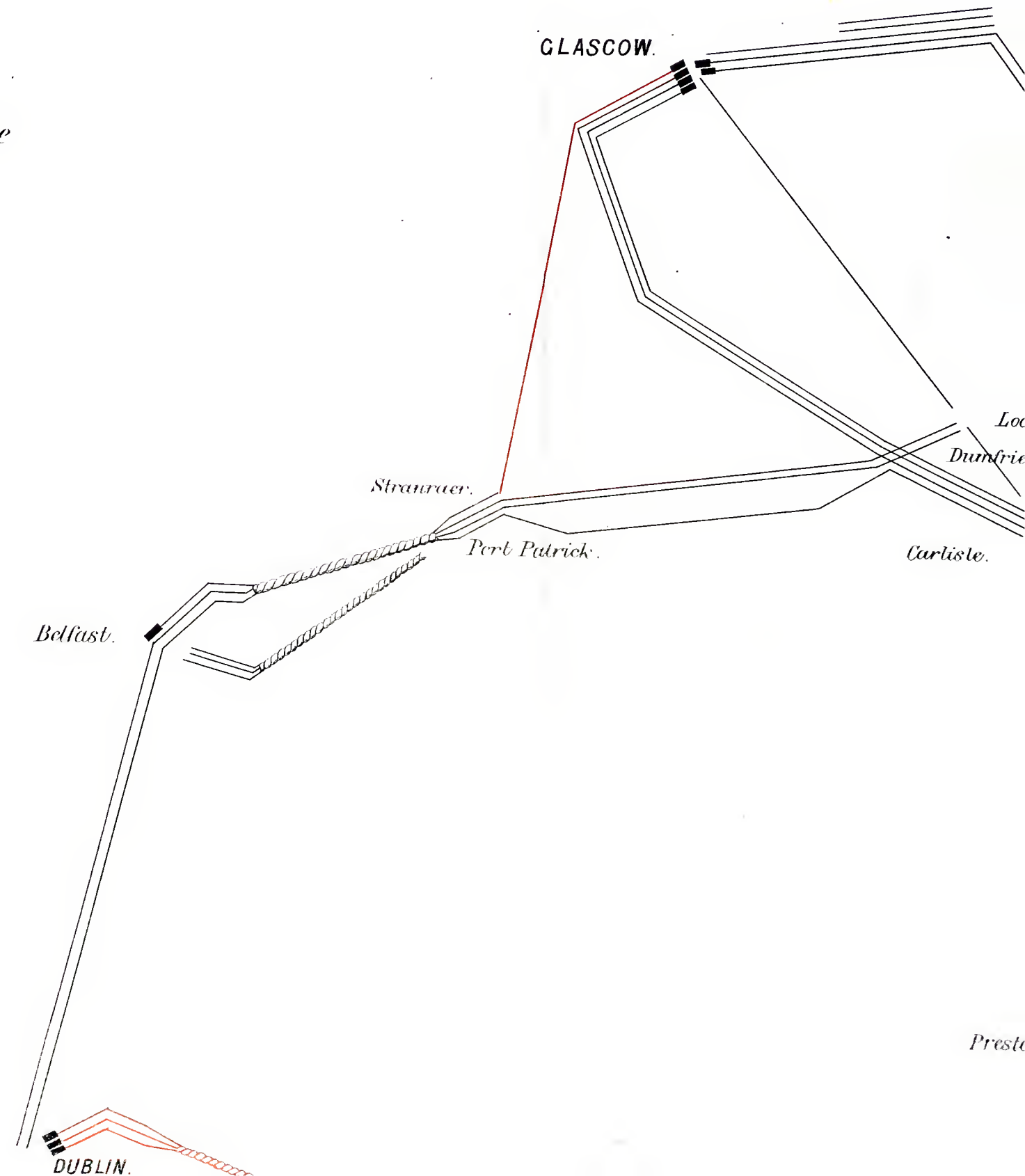


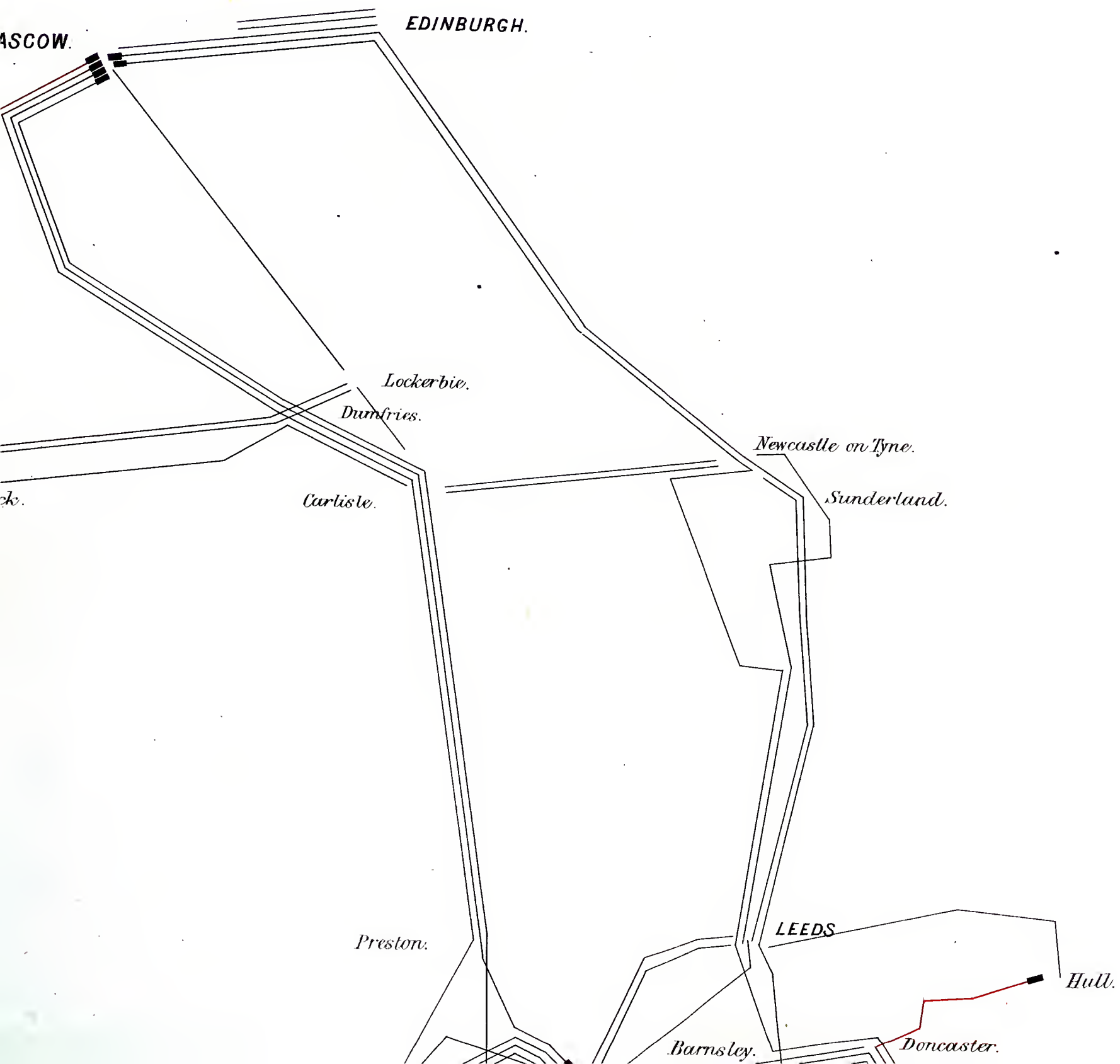


NEW WIRE SCHEME

DIAGRAM, 2.

Shewing the 17 Circuits, diverted as proposed, the new wires to be erected for the purpose being Coloured Red





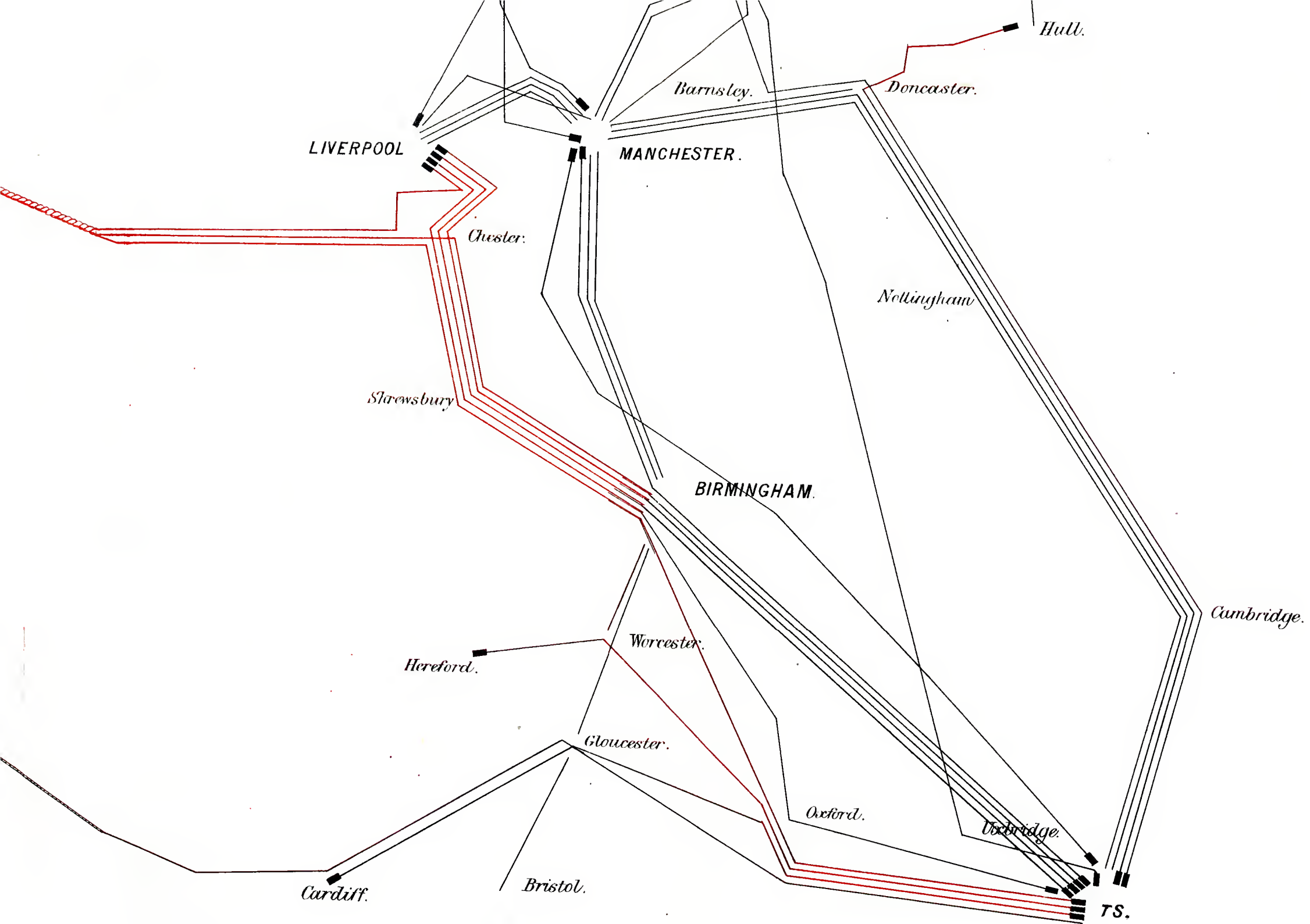
DUBLIN.

LIVERPOOL

Sta

Wellington Bridge

Cardiff.



1865.

NEW SOUTH WALES.

ELECTRIC TELEGRAPHS.

(REPORT FROM SUPERINTENDENT.)

Presented to both Houses of Parliament, by Command.

REPORT of the Superintendent of Electric Telegraphs, on the progress and general condition of Electric Telegraphs in New South Wales, for the years 1863 and 1864.

Department of Public Works.

Electric Telegraph Branch,

Office of Superintendent,

Sydney, 18 February, 1865.

SIR,

I have the honor to forward, for the information of the Honorable the Secretary for Public Works, a Report shewing the progress and financial condition of the Electric Telegraph Department to the end of the year 1864.

EXTENSIONS COMPLETED.

The extension of the Western line from Orange to Forbes, Young, and Wagga Wagga, was completed and handed over to the Government, May the 5th, 1863, and has since worked satisfactorily—having proved a valuable addition to the Southern inter-colonial lines—and has reduced the interruptions between Sydney and Victoria to a minimum, in all only amounting to six hours during the year 1864.

From Deniliquin to Hay, eighty-one and a half miles; contract price, £43 per mile, and £15 per mile for wire on existing posts from Deniliquin to Conago, a distance of twenty miles; total cost, £3,367 2s. 10d. The station at Hay was opened, 7th May, 1864.

From Braidwood to Queanbeyan, thirty-six and a half miles; contract price, £37 per mile; total cost, £1,991 6s. 10d. Queanbeyan station opened, 13th August, 1864.

From Wellington to Dubbo, thirty and a half miles; contract price, £41 10s. per mile; total cost, £1,471 10s. 9d. Dubbo station opened, 12th November, 1864.

The additional wire between Sydney and Newcastle was completed and opened 1st January, 1864; since which, the receipts at the principal stations on the Northern Line have considerably increased.

The extension from Braidwood to Araluen, fifteen and a half miles, contract price £34 per mile, is completed, and will be opened in a few days.

LINES IN PROGRESS.

The line from Murrurundi to Mudgee, 130 miles, the contract price for which was accepted at £37 per mile, is rapidly progressing, and will be completed about the end of February, 1865. This very necessary work will connect the northern with the western circuits, and insure more regular communication with the northern stations in this Colony and those in Queensland.

A contract has also been entered into for a line from Queanbeyan to Cooma, a distance of seventy miles, at £37 15s. per mile, to be completed in four months.

The South Australian Government having, after considerable delay, at length agreed to the division of receipts originally proposed by me, viz., two-thirds to accrue to New South Wales, and one-third to South Australia, on telegrams between Sydney and Adelaide, a contract has been entered into for the construction of the direct line from Deniliquin to our western boundary, at £36 10s. per mile, to be completed in eight months, by which time the South Australian section will also be ready.

When in operation, this line will relieve the Victorian lines of the whole of the business between New South Wales and South Australia, and will greatly facilitate the transmission of messages between the two latter Colonies, as one repetition only will be necessary, instead of three as at present. I have every reason to believe that there will also be a tolerable and increasing business with the several stations on the Edward and Murray Rivers; but in the mean time, the annual amount now paid to Victoria for business which this line will take, will almost cover the working expenses of the new stations, independent of their own receipts.

PROPOSED EXTENSIONS.

The Select Committee of the Legislative Council on Light-houses, in 1863, recommended that lines of Electric Telegraph should be extended to the several light-houses along the coast of the Colony. With a view to the accomplishment of so desirable an object, it will be necessary to carry the present lines to the nearest convenient townships, where permanent telegraph stations, worked on the Morse system, should be established, and from which points the light-house lines might branch; for which latter, alphabetical instruments, for the sake of economy and easy manipulation, should be used.

To connect the Gabo Island light, a line from Cooma to Eden, a distance of eighty miles, *vid* Merrimbulk and Panbula, would be required; the estimated cost of which would be £3,750, thence to Gabo Island, thirty-five miles, about £2,000.

The Jervis Bay light could be connected by extending the present line from Kiama to Shoalhaven, with an alphabetical line from Shoalhaven to the light; the distance would be about forty miles, and the cost about £2,000.

Port Stephens light could be reached from Newcastle, at a cost of about £1,500.

The above lines would prove of the utmost value in cases of shipwreck, or vessels in distress; also, for the purpose of transmitting warning signals during severe gales or storms, and more particularly in the event of war, when immediate information could be transmitted throughout the Colonies on the approach of an enemy's vessels.

A line from Bathurst or Orange to Carcoar and Cowra might be carried out, and prove a great boon to the inhabitants of that district. I also feel satisfied that, if the residents in the neighbourhoods interested would give the usual guarantee, the sum to be made up in order to indemnify the Government would be but trifling to commence with, and in a short time would cease altogether.

GUARANTEED LINES.

The lines guaranteed by individuals against loss to the Government have so far proved a success, and there is little doubt that, in a short time, they will cease in any degree to be a burthen on those whose public spirit induced them to become responsible. The following table will shew the amounts required to cover the loss in the case of each guaranteed line:—

Wellington to Dubbo line	...	...	...	...	£19	16	6
Deniliquin to Hay line	...	...	...	...	20	4	2
Braidwood to Queanbeyan	...	...	...	...	2	6	1
					<hr/>		
					£42		
					<hr/>		
					6		
					<hr/>		
					9		

BRANCH

BRANCH LINES FOR PRIVATE FIRMS.

No additional lines have been erected for private firms or companies, to connect the nearest line stations with business establishments, since 1862, although several applications have been received; it having been considered necessary to amend the Telegraph Act, in order to empower the Government to undertake such works—which amendment it is proposed to submit to Parliament during the present session—when there is every reason to believe the public will avail themselves of the facilities for communicating between their several places of business and the nearest Government Telegraph Office. The Coal Companies near Newcastle and in Illawarra will derive important advantages from the connection of their collieries with their principal offices, which will be effected on the payment of a small annual rental.

CONDITION OF THE LINES.

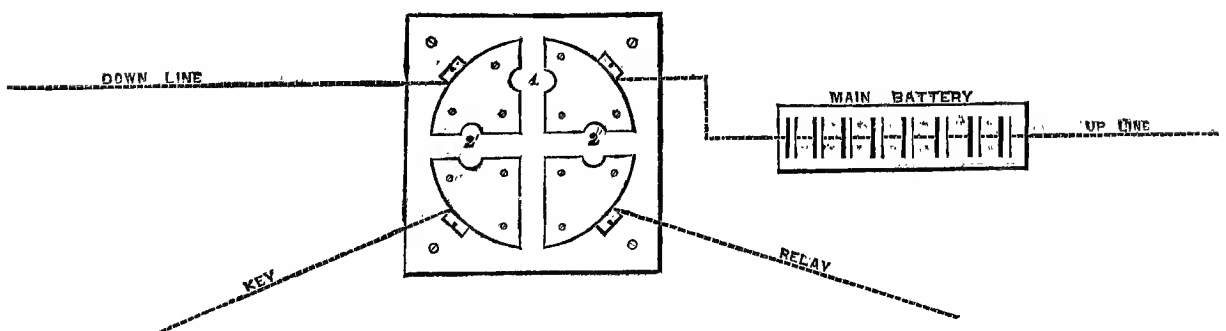
The Southern Lines have worked very satisfactorily since 1862. The Main Southern Lines have been put in thorough repair, a gang of men having travelled through from Sydney, and are now at work in the neighbourhood of Gundagai. Considering that these lines have been nearly seven years in operation, the repairs required have been trifling, beyond the clearing of overgrown scrub.

On the Western Line, between Penrith and Hartley, considerable damage has been done by the railway works; with this exception, the Western Lines have required nothing beyond the ordinary repairs.

The Northern Line, since the alterations on the southern portion, has not been so troublesome, the interruptions between Sydney and Queensland having been less frequent. On the completion of the Junction Line between Mudgee and Murrumbidgee, the public will seldom feel the inconvenience of delay, as there will not be more than 275 miles to the Queensland Boundary which will not be duplicated by a separate route.

The several branch lines are in good working order, and have seldom required more than the line-men have been able to manage in keeping them in repair, except the Grafton Branch, which has been washed away by the Upper Clarence at Tabulam, necessitating the removal of the line to a less dangerous crossing-place.

The lines in this Colony during the summer months appear to be much more affected by lightning than those in the neighbouring Colonies; and it frequently occurs that not only the lightning conductors, but the relay coils, are fused by the intensity of the atmospheric charges. To guard against this wholesale destruction, I have arranged a simple cutting-out switch, which completely disconnects the conductors and instruments from the line, leaving only the main battery in circuit. This plan has been found to work very satisfactorily, and has saved the destruction of many instruments, and the consequent delay of business at the several stations so visited. The following is a sketch of the cutting-out switch:—



When

When the station is cut out and the line switched through, a plug is inserted at 1: when the instrument is in circuit, plug 1 is removed, and two plugs inserted at 2' 2'.

LENGTH OF LINES AT PRESENT IN WORK.

	Number of Miles of Line.	Number of Miles of Wire.
SOUTHERN LINES.		
Sydney to Albury	365	730
Do. to Kiama... ..	94	94
Do. to South Head	7	7
Do. to Picton... ..	53	53
Goulburn to Braidwood	54	54
Gundagai to Kiandra	99	99
Do. to Moama	271	271
Braidwood to Queanbeyan	36	36
Do. to Araluen	16	16
Deniliquin to Hay	81	81
WESTERN LINES.		
Sydney to Penrith	34	34
Do. to Wagga Wagga	387	387
Bathurst to Wellington	146	146
Wellington to Dubbo	30	30
Mudgee to Murrurundi	130	130
NORTHERN LINES.		
Sydney to Queensland Boundary	517	679
Maitland to Newcastle	20	20
Do. to Morpeth	4	4
Newcastle to Singleton	48	48
Muswellbrook to Scone	16	16
Tenterfield to Grafton	112	112
	2,520	3,047

Making a total of 2,520 miles of line, and 3,047 miles of wire, which, on the completion of the lines in progress, will be increased to 2,990 miles of line, and 3,517 miles of wire.

RECEIPTS AND EXPENDITURE.

The receipts still shew a fair profit, although several branch lines have been constructed which, at present, do not return sufficient to cover their working expenses; but as the trade and importance of the districts which they connect with the main lines are undergoing a steady development, the lines in question are becoming remunerative.

The effects of the failure of crops, disastrous floods, and general depression of business during the last two years, are perceptible in this as well as in other branches of the public revenue.

TABLE shewing number of Messages and Receipts in 1863 and 1864.

STATIONS.	1863.		1864.	
	No. of Messages.	Receipts.	No. of Messages.	Receipts.
		£ s. d.		£ s. d.
Sydney	40,743	13,215 12 9	43,980	13,865 10 9
Redfern	1,345	179 19 11	1,065	150 15 2
Parramatta	1,798	179 3 10	1,386	128 17 2
Liverpool	434	58 18 5	297	36 12 2
Campbelltown	1,242	175 3 2	803	103 2 5
Wollongong	1,289	206 7 3	1,230	187 10 8
Kiama	621	107 8 2	509	85 6 3
Picton	627	88 2 8	747	89 6 0
Berrima	511	85 12 0	440	75 12 7
Goulburn	2,742	757 7 7	2,521	646 6 11
Braidwood	1,209	380 2 7	1,487	445 5 1
Yass	1,901	474 6 9	1,690	448 5 0
Gundagai	1,032	234 11 10	1,266	343 11 5
Kyamba	80	17 17 11	199	43 1 8

Messages and Receipts—*continued.*

STATIONS.	1863.			1864.				
	No. of Messages.	Receipts.			No. of Messages.	Receipts.		
		£	s.	d.		£	s.	d.
Albury	15,826	540	17	8	18,030	590	3	11
Tumut	900	274	11	9	874	234	12	0
Kiandra	266	88	9	2	305	105	7	9
Wagga Wagga	1,514	434	18	8	1,924	582	17	4
Urana	490	192	17	6	422	132	10	11
Deniliquin	1,923	755	13	11	2,346	860	19	2
South Head... ..	237	14	7	0	180	8	19	3
Penrith	1,480	203	13	7	1,350	184	15	3
Hartley	509	88	12	1	425	79	0	1
Bathurst	5,461	1,537	11	8	4,162	949	11	9
Orange	1,610	353	18	8	1,619	376	14	10
Forbes	3,850	1,124	1	4	1,840	563	0	5
Young	2,077	846	0	11	1,665	570	7	5
Sofala	936	158	2	10	640	103	6	9
Tambaroora... ..	1,087	207	17	6	939	193	7	3
Windeyer	409	96	0	8	298	65	5	4
Mudgee	2,770	771	0	0	2,261	552	18	10
Wellington	733	196	0	6	759	200	6	10
Windsor	1,107	202	19	4	976	137	17	5
Wollombi	115	23	2	1	117	20	14	5
Maitland	5,008	1,174	19	0	5,823	1,282	15	1
Morpeth	1,390	252	15	0	1,327	216	13	7
Newcastle	4,600	1,084	4	7	6,685	1,657	1	11
Singleton	1,940	360	2	6	1,976	344	5	3
Muswellbrook	1,010	170	4	10	1,158	178	19	8
Scone	443	84	2	5	386	74	10	3
Murrurundi... ..	875	261	16	11	695	173	0	1
Tamworth	1,054	287	10	6	842	235	13	10
Bendemeer	298	61	3	7	471	117	0	2
Armidale	3,300	459	16	3	1,509	397	18	8
Glen Innes	459	113	15	7	555	135	9	5
Tenterfield	4,197	301	3	9	7,554	278	14	11
Grafton	1,132	320	2	5	1,089	292	10	8
East Maitland	58	12	9	4	431	93	7	1
Hay ... ..	.....	.....	.....	.....	669	245	17	1
Queanbeyan ... ..	.....	.....	.....	.....	353	95	17	10
Moama ... ..	.....	.....	.....	.....	103	20	11	2
Dubbo ... ..	.....	.....	.....	.....	122	27	14	0
Rent of Bellambi Branch Line ... ..	.....	12	10	0	.....	12	10	0
Balances due from other Colonies on business ... ..	.....	370	11	8	.....	593	10	9
Due on Guaranteed Lines... ..	.....	.....	.....	.....	.....	42	6	9
	124,638	29,599	0	0	130,500	29,678	8	4

RESULTS of Year ending 31 December, 1863.

Total cost of construction to 31st December, 1863, (not including Expenditure by Colonial Architect)	£	s.	d.	£	s.	d.
Half-salaries of Superintendent and Accountant, chargeable to construction	.....	.....	.....	118,440	12	2
	.....	.....	.....	500	0	0
	.....	.....	.....	118,940	12	2
Revenue collected during the year 1863, viz. :—	29,215	18	4			
Value of Messages transmitted	12	10	0			
Rent, Bellambi Line	370	11	8			
Intercolonial Balances	.....	.....	.....	29,599	0	0
Less—working expenses	.....	.....	.....	20,449	3	9
Net profit, 7 $\frac{3}{4}$ per cent.	£			9,140	16	3

RESULT

Result of Year ending 31st December, 1864.

						£	s.	d.
Total Cost of Lines in operation on 31st December, 1864, not including								
Expenditure by Colonial Architect						132,025	18	3
						£	s.	d.
Revenue collected during 1864						29,623	11	7
Contract for Bellambi Line						12	10	0
Balances of 5 per cent. Guarantees on conditional								
Lines, viz. :—								
Dubbo				19	16	6		
Hay				20	4	2		
Queanbeyan				2	6	1		
						42	6	9
Working Expenses, same period						22,085	1	7
Net Revenue						£	7,593	6 9

Being net profit on cost of construction of 6 per cent. per annum.

NOTE.—There was a considerable diminution in the number and value of Government messages transmitted, but an increase in private business, during the year.

It has been frequently asserted that the present rates of charge for telegrams are too high, and that a reduction would induce an increase of business and revenue. It is natural, of course, that those who are interested in obtaining a reduction should advocate a lower charge ; but, as I have shewn in a previous Report, there is nothing to warrant the assumption that the result would justify the anticipation. In further support of my opinion, I may here quote the fact that, induced by the force of competition, the English Companies reduced their scale of charges to a minimum, in the belief that they would thereby increase their receipts ; but although they have the advantage of a large population to operate upon, the dividends of the leading Companies have, in consequence, been reduced from 12½ to 7½ per cent., and some Companies now pay no dividend at all.

In proportion to the population, the lines in this Colony contrast well with those in more populous countries ; and it is a self-evident fact, confirmed by experience, that it is impossible to force a telegraph business where the population is limited, and where their business transactions are not of an urgent nature. Reductions have been made in their tariff by a neighbouring Colony, which resulted in considerable loss of revenue ; and I feel assured it would prove suicidal to the best interests of the department, if a similar step were at present adopted here.

COMPARATIVE Table, shewing the number of Telegrams transmitted by the following Countries, in proportion to their Population ; also, the number of Stations, and average number of Messages from each.

Countries.	Population.	Telegrams per Annum.	Telegrams in proportion to Population.	Length of Wire.	Number of Stations.	Average Messages per Station.
United Kingdom	36,000,000	*3,000,000	1 to every 12	53,000	1,375	2,182
France	38,000,000	*2,500,000	1 „ 15	64,300	1,301	1,921
New South Wales	379,000	130,500	1 „ 3	3,047	52	2,384

* Including foreign and continental messages.

It will be seen by the above table, that in New South Wales one message is sent by every three persons, whereas in England and France it is one to twelve, and one to fifteen, respectively. The average number of messages from each station in this Colony is also greater than in either of the kingdoms above mentioned.

It

It has been sometimes urged that the Telegraph Service should be more immediately connected with the Post Office. This I consider quite unnecessary, and has been tried in Europe and failed. In France, Russia, Prussia, Austria, Spain, Belgium, and Switzerland, the Telegraph and Postal Services are under the respective Governments, but are in no way connected.

In Spain and France the telegraphs are under the Minister for the Interior. In Russia, Prussia, Italy, Belgium, and Switzerland, they are under the Minister for Public Works. In Austria the Administrations of the Telegraphs and Post Office were for a time united, but it was found expedient to separate them.

A great deal of jealousy has already shewn itself in this Colony, through the Country Post Offices forming portions of the telegraph buildings; and claims have actually been made by the Country Postmasters to an equal share of the stations, which, if complied with, would have been clearly unjust to the officers of this department, as not only is the major part of the cost of erection defrayed by the Telegraph Service, but the accommodation supplied (four rooms only) is calculated as part of the Station Master's salary.

I see no objection to the same number of rooms being provided for the Postmasters on the telegraph allotments, and would recommend that a sum be placed on the Estimates for that purpose, as I feel convinced that disagreements of a serious nature will occur as long as the same buildings are used by both departments.

LINES IN OTHER COLONIES.

Through the courtesy of Mr. McGowan, the General Superintendent of Telegraphs in Victoria, who has kindly supplied me with the following information, I am able to shew the progress of the Telegraph Department in that Colony, to the end of 1864.

The following new Offices have been opened for business in Victoria:—

Swan Hill .....14 April, 1863.	Castlemaine Railway 23 July, 1863.
Smythesdale .....18 June, 1863.	Kerang..... 6 Aug., 1863.
Moonambal .....25 June, 1863.	Colac.....27 Aug., 1863.
Ballarat Railway. 13 July, 1863.	Camperdown 6 Oct., 1863.
Sandhurst Railway 22 July, 1863.	Newstead .....29 Oct., 1863.
Red Bank.....22 Dec., 1863.	Mortlake .....17 June, 1864.
Sale .....22 Sept., 1864.	Port Albert 1 Dec., 1864.
St. Armand.....21 Jan., 1865.	

LINES IN PROGRESS.

A line is being carried from Hamilton to Casterton, from which place it is, I believe, intended to extend the line to the South Australian boundary, to join the lines in that Colony, which will form another loop-line which will be available in the event of interruptions.

Another line is in progress, from Benalla, on the North-eastern Line, to Wood's Point—a new gold field in the north of Gipps Land.

A Statement of Receipts, Expenditure, and number of Messages, for the years 1863 and 1864, is shewn, page 10.

IN SOUTH AUSTRALIA.

From Mr. Todd's voluminous and valuable Report for 1863, I find that the following Extensions were completed during the year:—From Kadina to Wallaroo, rather more than seven miles, opened, 23rd March,—total cost, £416 13s. 7d.; from Penola to Kincaid, 31 miles,—costing £1,496 11s. 5d.; Kincaid was opened on the 20th July; a station was also opened at Wellington, on 17th March; Riverton was opened in March, and Halendorf in April, 1864.

Mr. Todd appears to be unable to procure suitable timber in South Australia for durable telegraph poles, and recommends that the lines which require repairs should be re-poled

re-poled with Swan River mahogany, as the local timber will not last, on an average, more than six or seven years in the ground. Contracts, I have since been informed, have been accepted for this purpose, at 17s. 10d. per pole 23 feet long.

The long-talked-of direct line between South Australia and New South Wales is at last fairly started; and the first section, between Gawler Town and Blanch Town, on the Murray, is under construction. From Blanch Town to the boundary it is intended to carry the line direct to Overland Corner, where it will cross the river; the high cliffs on one side being made available to give sufficient elevation to the wire, so as not to interfere with the traffic on the river during floods. The length of line from Gawler Town to the boundary near the Salt Creek, will be about 160 miles.

The receipts on the South Australian lines shew a steady increase, which can be referred to at page 10.

IN QUEENSLAND.

The lines in operation previous to 1863 were from Brisbane to the New South Wales boundary at Maryland, a distance of 157 miles; also, a short line to Lytton, near the mouth of the Brisbane River; since which date, the following extensions have been added:—

Brisbane to Cape Moreton, 89½ miles; opened, August 2nd, 1864.

Dalby to Rockhampton, 455½ miles; opened, January 5th, 1865.

Rockhampton to Gladstone, 90 miles; opened, January 14th, 1865.

Total number of miles, 792.

LINES IN PROGRESS.

Broad Sound to Port Denison.—A branch line to Clermont, and a line from Hawkwood to Taroom.

I have not been favoured with any information respecting the receipts and expenditure of the lines in the above Colony, so am unable to give a detailed account, but I believe they about cover their working expenses.

IN NEW ZEALAND.

I have been favoured with a report from the Telegraph Engineer in this Colony, from which it appears that the Southland Provincial Government have erected a line from the Bluff to Invercargill; which line, it is recommended, should be purchased by the General Government, to form a portion of their Main Trunk Line.

From Invercargill to the Mataura River, the whole of the posts have been erected.

From Mataura to Molyneaux the contractor is busily engaged erecting poles; and between the latter place and Dunedin, the posts have been erected under a contract entered into with Mr. James M'Kenzie, by the Otago Provincial Government, which is now to be transferred to the General Government.

From Dunedin to Waitaki the posts have been erected under contracts entered into with the Otago Provincial Government; but some difficulty appears to have arisen which necessitated the transfer of nearly the whole of the poles, which had been erected in the midst of bush, and so mixed up with the poles of the private line of Telegraphs to Port Chalmers, as to render the working of either line a matter of impossibility.

Waitaki and Timaru. Posts have been deposited at points marked out by telegraph surveyor.

Timaru to Christchurch.—Most of the posts for this section have been laid along the line, and are ready for erection.

The section between Christchurch and Nelson does not appear at present to be in a very forward state, but the whole of the contracts have been let for the supply and delivery of the poles.

The distances are not enumerated in the report, and at present I am unable to state the total length of the lines in this island.

From Auckland I have little or no information, beyond the fact that there exists a military telegraph from Auckland to Drury, a distance of about forty miles.

LIST OF STATIONS IN EACH COLONY.

NEW SOUTH WALES.

Sydney.	Tumut.	Wellington.	Araluen.
Redfern.	Kiandra.	Morpeth.	Moama.
Parramatta.	Wagga Wagga.	Newcastle.	Hay.
Liverpool.	Urana.	Singleton.	South Head.
Campbelltown.	Deniliquin.	Muswellbrook.	Penrith.
Wollongong.	Hartley.	Scone.	Dubbo.
Kiama.	Bathurst.	Murrurundi.	Windsor.
Picton.	Orange.	Tamworth.	Wollombi.
Berrima.	Forbes.	Bendemeer.	Maitland.
Yass.	Young.	Armidale.	Glen Innes.
Gundagai.	Sofala.	Goulburn.	Tenterfield.
Kyamba.	Tambaroora.	Braidwood.	Grafton.
Albury.	Mudgee.	Queanbeyan.	East Maitland.

Length of line—3,047 miles.

VICTORIA.

Melbourne.	Beaufort.	Inglewood.	Footscray.
Williamstown.	Streatham.	Kerang.	Mortlake.
Geelong.	Hexham.	Swan Hill.	Chiltern.
Queenscliff.	Otway.	Gisborne.	Woodend.
Point Lonsdale.	Creswick.	Kyneton.	Taradale.
Sandridge.	Daylesford.	Castlemaine.	Werribee.
Schnapper Point.	Maldon.	Sandhurst.	Buninyong.
Cape Schanck.	Dunolly.	Echuca.	Hamilton.
Portland.	Carisbrook.	Kilmore.	Smythesdale.
Belfast.	Maryborough.	Longwood.	Ararat.
Warnambool.	Avoca.	Benalla.	Stawell.
Camperdown.	Moonambel.	Wangaratta.	Talbot.
Colac.	Red Bank.	Beechworth.	Heathcote.
Port Albert.	Clunes.	Yackandah.	Newstead.
Ballarat.	Wahgunyah.	Rutherglen.	Sale.
St. Arnaud.	Tarangulla.	Belvoir.	

Length of line—2,826½ miles.

SOUTH AUSTRALIA.

Adelaide.	Gawlerstown.	Mount Barker.	Guichen Bay.
Bowden.	Roseworthy.	Nairne.	Mount Gambier.
Alberton.	Freeling.	Woodside.	Penola.
Port Adelaide.	Kapunda.	Strathalbyn.	M'Donnell Bay.
Peninsula.	Clare.	Willunga.	Kadina.
Dry Creek.	Burra.	Port Elliott.	Wallaroo.
Salisbury.	Gumaracka.	Yankalilla.	Auburn.
Smithfield.	Glenelg.	Goolwa.	Wellington.
Hahndorf.	M'Grath's Flat.	Kincraigs.	Riverton.

Length of line—1,074 miles.

QUEENSLAND.

Brisbane.	Durah.	Rockhampton.	Moreton Island.
Lytton.	Maryborough.	Towoomba.	Banana.
Dunwick.	Hawkwood.	Warwick.	
Ipswich.	Dalby.	Gladstone.	

Length of line—792 miles.

COMPARATIVE STATEMENT of Receipts and Expenditure in New South Wales, Victoria, and South Australia.
1863.

NEW SOUTH WALES.			VICTORIA.			SOUTH AUSTRALIA.		
CAPITAL—£118,940 12s. 2d.			CAPITAL—£222,846 5s. 11d.					
		£ s. d.			£ s. d.			£ s. d.
Messages, 124,638.	Cash receipts	29,599 0 0	Messages, 156,482.*	Cash receipts*.....	25,768 15 8	Messages, 86,411.	Cash receipts	8,429 19 1
	Working expenses	20,449 3 9		Working expenses	35,645 11 9		Working expenses	9,108 0 8
	Net revenue	9,149 16 3		Net loss	9,876 16 1		Net loss.....	678 1 7

1864.

NEW SOUTH WALES.			VICTORIA.			SOUTH AUSTRALIA.		
CAPITAL—£132,025 18s. 3d.			CAPITAL—£238,696 5s. 11d.					
		£ s. d.			£ s. d.			£ s. d.
Messages, 130,500.	Cash receipts	29,678 8 4	Messages, 184,441.*	Cash receipts*.....	29,121 18 1	Messages, 106,874.	Cash receipts	10,994 13 8
	Working expenses	22,058 1 7		Working expenses	35,978 6 3		Working expenses	9,500 0 0
	Net revenue	7,593 6 9		Net loss	6,856 8 2		Net revenue	1,494 13 8

* Exclusive of O.H.M.S. business, which is not paid for in Victoria.

THE ANGLO-AUSTRALIAN TELEGRAPH.

Since my last report on the Anglo-Australian Telegraph, in March, 1863, nothing of a definite character has been done towards the realization of this important object. The lines are gradually stretching down from the northward towards India, and appearances warrant the assumption that, with so many Imperial interests urging on the undertaking, they will soon be extended to Singapore, on their way to China and these countries respectively. Arrangements made by the Dutch Government, leave no doubt that the continuation from Singapore to Batavia will be a matter of early accomplishment. From Java to this continent, the extension of the line may be said to be the special business of those Colonies which, by geographical position, are immediately interested in this great question.

With the view of connecting the Indo-Australian cable, the Queensland lines are now steadily extending northward; and that Government, I have no doubt, will at once complete their system to the Gulf of Carpentaria; more particularly, should the South Australian Government agree to carry on the work from thence to their northern settlement at Adams Bay, Adelaide River, which would be of the greatest importance to the latter Colony.

The Queensland lines are now open as far north as Rockhampton, and are in progress of construction from thence to Port Denison, so that considerably less than 700 miles of line would place the head of the Gulf of Carpentaria in communication with the rest of Australia, leaving about 800 miles, which would cost perhaps £50,000, to be provided for by the South Australian Government, in which line they would have a double interest. The question, therefore, becomes reduced to that of the sub-marine cable from Adams Bay to Java; and as this point is one which involves no risk, either as to the security of the cable or the remunerativeness of the outlay, I would strongly recommend that (even should the South Australian Government decline to form their land portion of the line to Adams Bay, and thus shut itself out from a participation in the extension) this Colony should join with Queensland in assuming the whole interest in the construction of the line from the Albert River to its connection with the Dutch portion.

Even if formed by a Company, it will be recollected that a subsidy must be guaranteed, representing a certain return on the outlay for the line, while experience warrants the assertion that the undertaking would yield a magnificent return, which has hitherto been the case with all main trunk lines, so much so, that I have no doubt there would be little or no difficulty in obtaining contractors who would manufacture and lay the cable, and undertake the working, for a fixed annual subsidy, in the same manner as Messrs. Glass and Company are working and maintaining the Malta and Alexandria line.

Should

Should the proposition be entertained, that the three Colonies most interested at once enter into preliminary arrangements for starting the project, it will be borne in mind that not only will a large profit accrue from the sub-marine portion, but that an increased business will also be necessarily thrown upon the existing lines, which business will prove an indirect source of revenue of no small magnitude, as the proposed line will form the sole telegraphic channel of communication between Australia and nearly the whole of the World.

The Persian Gulf cable has proved a success; and it is now time for active measures to be taken, to secure to these Colonies one of the greatest boons which mankind possess, which can be accomplished without serious risk or outlay; as I am satisfied that a subsidy, after the first year, would not be required, and that the entire scheme would be self-supporting.

There is one other matter which should not be passed over, that is, the immense saving which would be effected in freights and insurance by manufacturing the cable in Australia. Instead of steam-vessels being required, provided with tanks and other expensive fittings, for the bringing out and protection of so delicate a freight, the whole of the material could be shipped in its unmanufactured state at ordinary rates in England. Of course, in such case, experienced engineers and artisans would be required, who could be sent from Europe with the material. The difference in the expense saved by these means would be at least 20 per cent. on the entire contract.

It may be urged that steam-vessels fitted up with water-tight tanks will be required, and must be brought out from England, to lay the cable: this is quite unnecessary, as there would not be the slightest difficulty in procuring suitable vessels for the purpose in this country, at a far less expense; the time occupied in coming out and returning home being saved. The tanks, paying-out machinery, and all the necessary fittings, could also be put on board in the Colony, at a very trifling additional cost.

I am still of opinion that the only satisfactory mode of initiating the preliminaries for carrying out this undertaking would, as previously recommended by me, be by a meeting of representatives from the several Colonies interested, to take place in Sydney or some other convenient place, to fully discuss the subject and bring up a joint report, recommending the best route, and the most economical plan, for the accomplishment of so desirable an object as the completion of an unbroken line of Telegraph between England and Australia.

E. C. CRACKNELL,
Superintendent of Telegraphs.

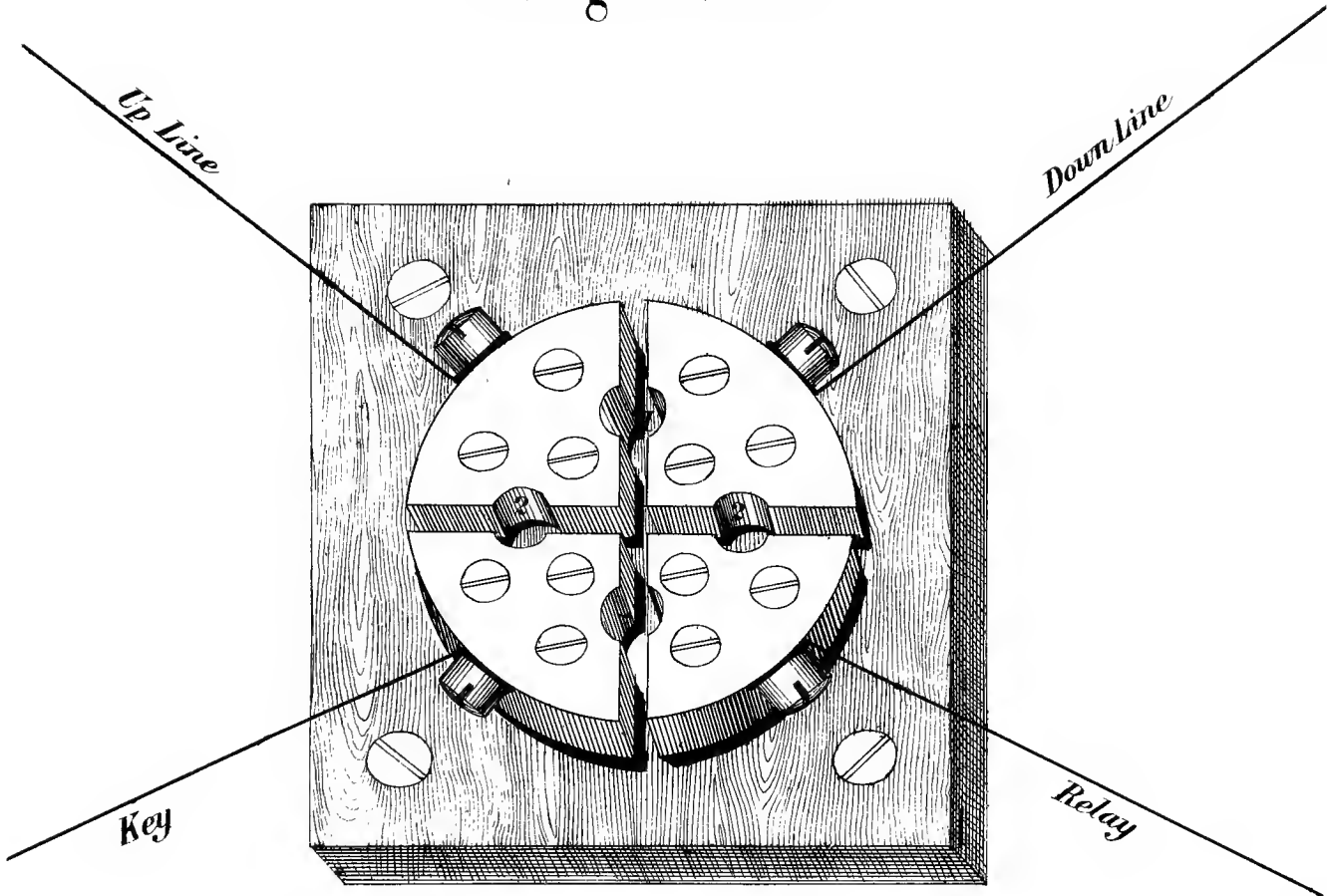
APPENDIX,

Shewing the capital invested, number of messages and receipts, from the opening of the first lines in New South Wales, in 1858, to the end of the year 1864.

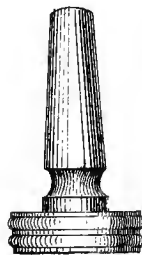
1858.		£	s.	d.
Capital invested—£17,253 12s. 11d.				
No. of messages—9,141.	Cash receipts	1,932	19	9
	Working expenses	2,087	8	6
	Net loss	154	18	9
Number of stations—11.				
1859.		£	s.	d.
Capital—£23,816 19s. 9d.				
No. of messages—36,867.	Cash receipts	7,826	0	10
	Working expenses	4,646	9	9
	Net profit	3,179	10	1
Number of stations—12.				
1860.		£	s.	d.
Capital—£48,454 2s. 2d.				
No. of messages—53,951.	Cash receipts	12,136	13	2
	Working expenses	9,408	12	4
	Net profit	2,728	0	10
Number of stations—23.				

	1861.				
	Capital—£60,615 13s. 3d.			£	s. d.
No. of messages—74,224.	Cash receipts .. ..	..	..	16,542	8 9
	Working expenses .. ..	..	..	12,915	15 4
	Net profit .. ..	..	..	3,626	13 5
	Number of stations—36.				
	1862.				
	Capital invested—£116,234 11s. 7d.				
No. of messages—104,660.	Cash receipts .. ..	..	..	25,513	9 8
	Working expenses .. ..	..	..	16,780	7 5
	Net profit .. ..	..	..	8,733	2 3
	Number of stations—47.				
	1863.				
	Capital invested—£118,940 12s. 2d.				
No. of messages—124,638.	Cash receipts .. ..	..	..	29,599	0 0
	Working expenses .. ..	..	..	20,449	3 9
	Net profit .. ..	..	..	9,149	16 3
	Number of stations—48.				
	1864.				
	Capital invested—£132,025 18s. 3d.				
No. of messages—130,600.	Cash receipts .. ..	..	..	29,678	8 4
	Working expenses .. ..	..	..	22,085	1 7
	Net profit .. ..	..	..	7,593	6 9
	Number of stations—51.				

Cutting out Switch



Lithographed at the Surveyor Generals Office Sydney Oct. 1865.



Plug

ATLANTIC TELEGRAPH COMPANY, LIMITED.

REPORTS AND OPINIONS

IN REFERENCE TO THE

SELECTION OF THE BEST POINT FOR LAYING THE CABLE.

JULY, 1857.

H.M.S. "AGAMEMNON,"

GREENWICH, JULY 6.

SIR,

Considering the principal matter for discussion on Wednesday next will be the advantages or disadvantages of commencing to lay the Telegraphic Cable from Ireland, I have reduced my ideas on that important point to writing, considering it will assist the maturity of the deliberations if they are previously discussed by those more able than myself to form a correct estimate of their weakness or strength. I therefore enclose them with this intent.

I am, SIR,

Your obedient Servant,

C. NODDALL, Master Commanding.

To George Saward, Esq.

ADVANTAGES OF COMMENCING TO LAY THE TELEGRAPHIC CABLE] FROM IRELAND.

The almost certainty of passing over that portion of the track between 10° and 15° in fine weather—Maury stating that "there is scarcely a liability of a gale in the month of August in any year, until you approach the Irish Coast, when the chances of encountering one are about three in thirty."

The chances in case of a gale or strong breeze of it, coming from the westward, more particularly as we have already had a continuance of easterly winds in May and June, as also at all times the prevalence of westerly winds in those seas.

As the cable as coiled in "Agamemnon" now affords greater facilities for paying out than the "Niagara," if any difficulties should arise in laying down the first half—which are not yet foreseen or anticipated—such as there not being sufficient spare cable to complete the distance, &c., such experience will save the Niagara's half, as well as what may remain in Agamemnon.

The 600 miles of spare cable would be available for the entire route. Whereas, when the ships are laying each half down simultaneously, one vessel having had fine weather, may

perform her task and land her end with 100 or more miles to spare, while the other, encountering bad weather, might not have enough to reach the land.

Should this plan be adopted, and all go right, and the cable as to distance be laid satisfactorily, till 1,100 miles, or thereabouts, is paid out, and then a favourable state of the weather ensue, the splicing of the Niagara's end might be immediately undertaken, the Agamemnon following her consort on to the American shore with the remaining portion, to assist, if necessary.

If an extreme case should occur, such as both Niagara and Susquehanna breaking down, there would be the Leopard and Cyclops to assist, even if the Agamemnon should not follow after her portion is laid out.

The exact knowledge that if continuity or insulation is destroyed the portion paid out must be recovered, to try back and find the cause; if both vessels are at work, it may not be known which end is in fault.

Only the Niagara's portion of the steel wire rope need be used.

I propose the splice be effected while Niagara tows Agamemnon, about 50 fathoms apart slowly westward.

The Company in London would be hourly advised of the progress of the work, and in case it should be required we could secure their opinions on a knotty point.

Maury states that, without a doubt, the most propitious time is about the end of July and beginning of August, more particularly as regards the Irish coast; if the line be laid down simultaneously, the Irish coast will be approached about the 20th of August, supposing we leave Cork on the 1st of that month—if later, the argument becomes more forcible for adopting this plan.

Disadvantages of commencing to lay the telegraphic cable from Ireland.

The time employed in submerging the cable would, under the most favourable circumstances, be double.

The difficulties and dangers of uniting the Cable in mid-ocean under the chances of bad weather.

The chances of parting company with Niagara in thick weather, and that weather continuing so as to prevent her finding Agamemnon when the latter vessel's portion of cable was nearly or wholly expended, though Maury gives the relative frequency of fogs between 30h. and 35h. as 0.

C. NODDALL,

Master Commanding H.M.S. Agamemnon.

Greenwich, July 6.

REASONS FOR PREFERRING TO COMMENCE THE LAYING DOWN OF THE ROPE BY FASTENING THE EASTERN END TO IRELAND.

1. The securing of the end to the shore before the ship leaves the coast.
2. The advantage of starting from comparatively shoal water into deep water.
3. The prevalence of winds, having West in them, between Ireland and Newfoundland nine months in the year, and especially between the middle of May and the end of September.
4. The desirability and advantage of proceeding *against the wind*, which may be expected to blow with moderate force from the westward during the greater part of August.
5. The difficulty of regulating the speed of the ship in the event of a strong breeze or gale of *fair* wind.
6. Power of communicating from the ship to the shore as often as may be necessary or desirable during the process of passing out.

7. The advantage of having within speaking or signal distance the officers in command of the several ships employed, also of the engineer and electrician and their assistants, likewise of Professor Morse, who intends to proceed with the expedition.

8. The probability of weather affording favourable opportunity to splice the ends of the rope before the eastern half shall have been paid out.

9. In order to provide for emergency in case the state of the weather should be unpropitious, buoys (such as are already in course of preparation) or a large boat to serve as a buoy and beacon might be used, the boat of course to be decked all over, and made *perfectly tight*, two masts should be placed in her, one having a flag at the head, the other a mirror (at the top), contrived so as to reflect in all directions; these will be discernible at a considerable distance in clear weather in the event of the necessity of buoying the end of the rope during heavy weather, and temporarily losing sight of the buoy or beacon.

10. Presuming this course of proceeding to be pursued, there is every probability of the ship carrying the Western half, having a considerable excess of rope after reaching the land in Trinity Bay, which might be required for extending communication by submarine telegraph on that side, and be readily disposed of to advantage for the benefit of the Company.

I would suggest that all the ships (assuming, of course, that some part of the rope would remain after splicing on board the ship that carries the Eastern end) should proceed to Trinity Bay, and (if required) assist in securing the Western end to the American shore.

THOMAS H. BROOKING.

July 7, 1857.

Sir,

I HAVE been requested to give my opinion in regard to the proposed change in the plan of laying out the Atlantic Telegraph Cable. Instead of proceeding with the two Cable ships on the plan originally projected, to mid-ocean, joining there the two halves of the Cable, and parting the one ship towards Ireland, and the other towards Newfoundland, it is now proposed to commence from the shore end on the western coast of Ireland, and from the Niagara at once to lay out the Cable to mid-ocean, accompanied by the other ships, and there joining with the part on board the *Agamemnon*, proceed thence to Newfoundland.

My first impression was adverse to the new plan, solely, however, on the ground that it involved an additional delay of several days at a period when every hour is of immense importance to bring the operation of laying out the cable, within the limits of the moderate weather of the year upon the Atlantic. But on further reflection, weighing the advantages and disadvantages of the proposed change, my opinion is in favour of the new plan.

The disadvantages are :

First. A prolongation of the time employed in laying out the cable, and consequently the incurring of additional risks apparently, of stormy weather upon the ocean. Assuming that the Telegraph squadron sails from the Cove of Cork on the 1st of August, to commence operations from mid-ocean, (the original plan,) five days may be allowed the ships with their free use of sails and steam to reach mid-ocean. To this time add eight days for each of the cable ships to reach their respective destinations, and by the 13th of August, the cable will have been fastened to the American and European shores. But if the new plan is adopted, the squadron leaving Cork on the 1st of August, the *Niagara* can scarcely commence laying the cable from the Irish shore before the 2nd of August. Commencing then from the 2nd of August, the whole squadron must proceed towards mid-ocean at the paying out speed of the *Niagara*. Hence, eight days must be allowed to reach the point where the two parts of the cable are to be joined, and to lay the remaining half the

Agamemnon consumes eight days more, making in all eighteen days, instead of thirteen days, of exposure to the risk of gales.

Second. The second disadvantage of the new plan is the risk of encountering unfavourable weather at the critical moment when the two halves of the cable are to be joined. The necessity for proceeding to pay out at a certain definite speed from the time the ships leave the Irish coast will bring the period for joining the cables, at a *certain* definite time as to day or hour, but at an *uncertain* time as to the state of the weather. The joining of the two halves of the cable, however, must be made when mid-ocean is reached, whatever may be the state of the weather; and should the weather be stormy, it is argued that the safety of the cable would be endangered.

I think I have fairly stated the prominent disadvantages which at first blush are adverse to the new plan. The first disadvantage (that of prolonging the time at the risk of longer exposure to the risks of unfavourable weather), yields, when other circumstances are taken in connection with prolonged time. It is well known to nautical men, that in the early part of August uniform fine, calm weather prevails on the Atlantic in the pathway from Newfoundland to Ireland; but from the middle to the latter part of August gales may be expected, but they are sure to be upon the coast of Ireland, while milder weather prevails on the American side of the water. Gales at that season seldom or never occur on the Newfoundland coast. This fact, of great importance, not only removes the disadvantage from the new plan, but turns it over in its full force against the old plan. The risks of unfavourable weather are all on that side. For it is very certain that should the ships commence laying out from mid-ocean, the work cannot be commenced before the 6th or 7th of August, bringing upon the Irish coast, the ship which is to land the European end of the cable just in the season when a gale may be expected to occur on that coast. Should the ships on the contrary commence from Ireland, they commence in good weather, and, if the experience of good observers is correct, they will take fine weather with them through the whole operation from land to land, leaving the region where gales may be expected, long before the season of their occurrence. Thus, although a few days longer may be expended on the ocean, they will be passed in a region where the operations will be undisturbed by gales.

As to the second disadvantage, the chance of bad weather when it becomes necessary to connect the two halves of the cable, I would speak with great deference to the skill and experience of the engineers. I will yet venture respectfully to suggest, that having at least, as we will hope, some two or even three days of surplus cable on each ship, there are at least two days of choice of weather for connecting the cables. If, when the first half is paid out, up to within two or three hundred miles of the end of it, good weather should occur for connecting, might not the joining be then made with perfect success; and is it at all probable that weather unfavourable to such an operation can continue two days?

In this view of the case, the advantages of security to the integrity of the cable is on the side of the new plan.

Aside from other advantages of the new plan, I may briefly touch upon some that occur to me.

A principal one is the lessening the risks of embarrassment in the electrical testings which will be carried on without a moment's intermission, day and night, during the whole operation. By the first plan, two corps or staffs of operators will commence communicating with each other from each ship. It is obvious that instruments on ship board will at the best work to much disadvantage as compared with instruments on the land. These disadvantages are doubled by dividing the staff and instruments into the two ships, but they are lessened one half, if one station is on shore, as would be the case if the new plan is adopted, and the other on the ship which, for the time being, is paying out the cable. It may also be urged as an important advantage, that the whole strength of the scientific staff (which, on the old plan, is divided), will, on the new plan, be concentrated in the ship which is paying out

Not among the least of the advantages which the new plan presents over the old, is that of our ability in this case of communicating with the Company's head-quarters in London every moment from the time we leave the shores of Ireland until we arrive in Newfoundland, and can thus report every step of our progress.

These few hasty remarks are respectfully presented,

By your obedient servant,

SAML. F. T. MORSE.

To the Chairman of the Board of Directors of
the Atlantic Telegraph Company,
22, Old Broad-street.

Greenwich, 8th July, 1857.

No. 8, Ashburnham Terrace, Greenwich,

July 9th, 1857.

SIR,

On reflection since the meeting yesterday, and the exchange of views of the gentlemen present, upon the best plan for laying out the cable to insure success in every department of the enterprise, it appears to me that the reconciliation of the engineer's and the electrician's labours, is the point to which our attention is directed. All else is literally plain sailing. These are the Scylla and Charybdis between which we desire safely to steer.

If the plan of mid-ocean commencement is adopted, the engineer's labours are comparatively easy, while difficulties of a most serious nature are then devolved upon the electricians.

If the plan of commencing from the Irish shore is adopted, the electrician's labours are comparatively easy, while the difficulties of the engineer's department it is alleged are increased.

In this dilemma let us examine each of these categories with care.

If one must yield to the other, which can yield with the least risk to the success of the whole enterprise?

It must strike all, that the difference of the time in which the peculiar difficulties of the two departments of labour will operate is vastly disproportionate. The additional difficulties of the engineer's department in consequence of adopting the new plan, supposing them to be as great as the most unfavourable aspect in which they are viewed, can present, are so short in duration that they become as nothing in comparison with the duration of those that must devolve upon the electricians, should the original plan be adhered to.

The new engineering difficulties (supposing them to be real difficulties), do not begin until within a day or two at the utmost, of reaching mid-ocean; *an hour or two* then terminates them favourably or unfavourably.

The electrical difficulties in the old plan, on the contrary, commence from mid-ocean, and continue with increasing perplexity and complication to the end of the voyage. In this view of the matter it would seem but reasonable that the engineers, rather than the electricians, should endeavour to meet and overcome any new difficulties which this change from the original plan may produce.

My friend, the electrician of the company will state to you and with great clearness, the insurmountable nature of the difficulties we shall have to encounter, if the old plan is adhered to. No possible means now known to science can assure to each ship that confidence which is absolutely necessary, that it is proceeding judiciously in its work, and with certainty that it is not wasting the property of the company in paying out the cable when it should stop, and perhaps reel back.

In that direction, I confess I see nothing but uncertainty, and a weight of responsibility

and anxiety sufficient to break down the strongest nerves. From this weight, so far as is possible, we ought to be relieved.

It ought to be taken into consideration, also, that as yet we have had no opportunity of testing in one continuous length the entire cable. From the fact that the two halves of it have been manufactured so far from each other as to preclude the possibility (under existing circumstances) of uniting them till both cable ships are side by side in the Cove of Cork, we shall have, at the utmost, but two days to make all the experiments to ascertain if we have the apparatus and appliances necessary to meet and overcome all the difficulties which this new and untried condition of things may manifest.

Let me suggest, therefore, to our good friends, the engineers, whether the plan of a series of buoys attached to the last two or three miles of cable before reaching mid-ocean, is not in reality a most feasible, safe, and easy mode? I would speak with all deference to their superior skill and experience, but I cannot but think it perfectly practicable (whatever may be the state of the weather) to attach to the cable, at any desirable distances, small buoys, say at every hundred feet, which, acting like the hands of those who coil the cable in the tanks of the manufactory, or like the sheve poles which steady it and guide it into the ship, will each sustain its portion of the weight so far that when the end is arrived at, this end, if necessary, may be attached to a larger buoy, and without any risk whatever, may even be thrown overboard, and left to be picked up at leisure by the other ship after the gale has subsided.

I confess my convictions are so strong that this mode would accomplish the safe union of the cable, even in a gale of wind, that I am curious to learn what objections can be raised against it.

Certainly, if this difficulty can be overcome by this or any other mode, the other risks of the electrical department will, in a great measure, be overcome.

With great respect,

Your obedient servant,

SAMUEL F. B. MORSE.

To the Chairman of the Board of Directors of the
Atlantic Telegraph Company,
22, Old Broad Street, London.

I take it that the means of assuring ourselves of the electrical safety of the whole extent of our cable is a matter of paramount importance during the entire process of paying out, and this equally so whether it be done by the two ships consecutively or simultaneously.

If all go well, and signals are at no time interrupted during the voyage, either mode may be adopted with almost equal facility, so far as the electrical element is concerned; but if any accident occur to either end, the first thing that will inevitably arise will be the total interruption of all electrical communication.

Thus, then, our signals cease at the very moment when intercommunication is more than ever necessary for the guidance of the engineers.

It would seem to me to be scarcely justifiable to place our great undertaking in such a position as that one end of the cable having been irretrievably lost from either of the ships, the other vessel should still deliberately continue to throw away the whole of her remaining cargo of 1,000 miles or upwards into the sea.

I propose, therefore, to lay before you the possible occurrence of certain casualties as contingencies against which we ought to provide. And on the occurrence of any one of which we must be armed with such remedies and resources as nautical engineering and electrical science can furnish.

Under each of these circumstances, the paying out from two ships simultaneously,

seems greatly to increase the risk and the amount of loss; in the event of an accident occurring it deprives the electrician on board each vessel of the counsel and co-operation of his coadjutor in the other ship, while it leaves him to bear the onus during the whole period of the voyage without repose for a single hour; his anxieties are unrelieved even for an interval, and he may thus be rendered unfit for any emergency that may arise.

The *new plan*, on the other hand, though it prolong the time, yet gives the advantage of mutual counsel and support, while it affords also the opportunity of obtaining necessary rest at intervals.

FIRST CONTINGENCY.

The Temporary Cessation of Signals from Occurrence of Loss of Insulation—Upwards of 500 Miles paid out.

Original Plan—The vessel, over the stern of which it has occurred, readily detects the accident, repairs it, and continues her journey; this may have occurred six to thirty-six hours. Not so the other vessel, who detects the accident only by receiving no signals; she tests and finds “dead earth,” but cannot possibly ascertain whether the insulation is merely temporarily destroyed by the conductor having been laid bare to some extent, or whether the end may not have been lost altogether.

What is she to do? and how long to wait? She cannot stop, for by doing so she would necessarily endanger the safety of her own cable. If she knew the other end of the cable were lost, of course she would pay out no more; if she thought the injury capable of repair, she might continue her voyage without hesitation.

New Plan—No such hesitation or difficulty could be encountered, inasmuch as the accident speaks for itself on board the one ship to which it has occurred, and the course to be pursued is clear. The other end of the cable is known to be resting safely and free from such risks.

SECOND CONTINGENCY.

Temporary Cessation of Signals from Loss of Continuity—Insulation remaining perfect upwards of 1000 miles paid out—Weather fine.

Original Plan.—The vessel over the stern of which it has occurred, detects it readily, and begins to haul up, examine, test, and repair. This may occupy several hours; meantime the other vessel knows of the accident only by getting no signals, and the same difficulty and doubt arises as in the previous case.

New Plan.—The only vessel employed detects the accident readily, raises the cable, and takes such measures as enable her to repair it without undue haste, conscious that there is no vessel at the other end anxiously awaiting signals for the guidance of her future movements.

THIRD CONTINGENCY.

All having gone well for a certain time, the vessels being from 1,200 to 1,500 miles apart, one of them meets with bad weather, and the instruments get damaged, or the batteries are rendered for a time unserviceable; she may possibly receive signals, but can send none; the bad weather lasts several days, during which she continues to pay out her cable slowly and safely.

Original Plan.—The first vessel continues her course as soon as the gale permits, and may finish laying her portion successfully; meantime the other vessel may have been three days without any signals, and is unable by testing to ascertain the cause.

What course is she to pursue? Is she to assume, without any evidence, that all is right with the other vessel, and therefore to continue her course? or is she to suppose that the cable has been lost, and that it is her duty to save what may remain on board?

New Plan.—No such difficulty could arise.

FOURTH CONTINGENCY.

On the second or third day after commencing operations, 40,500 miles having been paid out, the weather becomes bad, the ship begins to pitch heavily if the wind be contrary, or if the wind be fair, she runs so fast that a kink may come up out of the hold, and the insulation of the cable be injured;—signals fail; she determines to “lay to,” and the storm increasing, it is not deemed safe to attempt to raise the cable lest it should end in total loss; it is therefore carefully and safely buoyed, the rough weather continues for three or four days, the buoy is lost sight of, but found again on the fourth or fifth day, and the cable, on examination, found to be all right, after hauling in a mile or two.

Old Plan.—The other ship not being able to ascertain whether the cable is totally lost or buoyed, must either go on hoping against hope, finding by her testing that there is entire loss of insulation, and having had no signals for five or six days; or on the other hand she must begin to haul up the cable, thus throwing away what might otherwise have been a success.

New Plan.—No such uncertainty could arise, the one vessel employed finding the cable all right at the buoy, would resume her operations.

FIFTH CONTINGENCY.

Two days after parting in mid-ocean, one vessel, either from being overtaken by foul weather, or from some other accident, loses her end of the cable; the other ship receiving no signals, but being unable to assure herself of the cause, continues her voyage, not being able to be overtaken, and thus sails on deliberately, throwing the whole of her cable into the sea, under a blind belief that, probably, all may yet be right with the other vessel.

SIXTH CONTINGENCY.

The very probable occurrence of terrestrial induced currents, of considerable force, in our wire when laid.

This may for some time embarrass the working of our instruments, and though this difficulty can ultimately be met by the resources of electrical science, yet it must be remembered that electric resources are necessarily limited on ship-board; and that until time has been given for such resources to be tried, each vessel must necessarily remain without signals from, and therefore be in ignorance of, the state of the other end of our cable.

Finally, let it be distinctly understood that when a distance of eleven or twelve hundred miles or upwards intervenes between the ends of the cable, I believe it to be impossible by any of the highest resources of electrical testing, or, indeed, by anything short of the receipt of actual signals from the distance, to assure ourselves of the condition of the remote end of the cable.

WILDMAN WHITEHOUSE,

Greenwich, July 9th, 1857.

July 9th, 1857.

Sir,

In accordance with the wish expressed by the Chairman of the Meeting yesterday, I proceed to give a written opinion on the question, whether it would be preferable to commence laying down the Atlantic Cable from mid-ocean or from the coast of Ireland.

The principal risk in the first case appears to be, that it is not impossible that the *Agamemnon* may be driven by a heavy gale from the westward, so fast as to endanger the Cable.

Should the gale be extremely violent, I can conceive little difficulty in the ship's lying to, when her drifts would be of course in the direction in which the Cable is to be laid, but since examining the *Agamemnon* yesterday, and her arrangements I feel convinced, that should she even scud at the rate of ten miles an hour, there is little danger of the cable fouling.

The principal risks in the other case seems to be in the passing the end of the Cable from one ship to the other, splicing it, and then bringing the weight and strain gradually, and without jerk on the new Cable; and all this to be done in a gale of wind (for as we have supposed a gale in the one case, it is but fair to have one in the other), and in the deepest water, where the Cable would have the greatest tendency to run out with speed.

I think the difficulties and the risks of injuring the Cable at this point, under these circumstances, would be very great, and if it were here to break, 1,200 miles of it would at once be lost.

These considerations, combined with the fact, that by starting from mid-ocean the time and consequently the risks in laying down the Cable will be reduced to one-half; that fine weather would be ensured for lowering the most tender part (the splice) to the bottom; that there is little chance at this time of the year of a gale of wind so violent as to affect a powerful ship like the *Agamemnon*; that supposing the ship bring her end to within twenty or thirty miles of the coast, it would be so much easier to buoy it (the water being shoaler) in case of fog or storm, rendering a nearer approach unadvisable, have brought me to the conclusion, after bestowing my best judgment upon it, that it will be preferable to commence laying down the Cable from mid-ocean.

I have the honor to be, Sir, your obedient Servant,

J. F. B. WAINWRIGHT, *Captain, R.N.*

H.M.S. Leopard.

H.M.S. AGAMEMNON,

Greenwich, 9th July, 1857.

Sir,

Having heard with attention the discussion yesterday relative to the merits of the plans proposed for connecting the Atlantic Telegraphic Cable with Ireland and Newfoundland, I am of opinion that the nautical advantages of starting with the end secured to Ireland, and connecting with the other ship's Cable when the first half is paid out, are greater than the plan of proceeding to mid-ocean and primarily connecting there; but in either case, the difficulties, as far as we sailors are concerned, can be met with comparative ease.

Mr. Bright and his able coadjutors in the Engineers' Staff, who have been practically engaged in laying down Submarine Cables, having all expressed such *decided* opinions as to the *positive* danger likely to accrue in uniting the Cable when one half is submerged, and they having devoted their attention to this question for so long a period, I should, if Mr. Whitehouse's objections can be satisfactorily met, bow to their judgment.

I am, Sir, your obedient Servant,

C. NODDALL, *Master,*

Commanding Agamemnon.

2, HANOVER SQUARE,
July 7th, 1857.

To the Chairman

ATLANTIC TELEGRAPH COMPANY,

Our co-Director, Mr. Brooking, having called the attention of the Directors to a consideration of the question, whether it would be preferable, in paying out the Atlantic Cable, to commence from the Coast of Ireland rather than in Mid-ocean, I promised to lay before you the result of my own reflections on this question.

My attention was, I believe, first called to this subject by our co-Director, Mr. Samuel Gurney, many months since, (when our Company was first started,) since then I have thought seriously upon the matter, although I had not entered into any discussion upon it before it was proposed for consideration by Mr. Brooking, at our last meeting; these views therefore, as the result of my own reflections only, may be considered as crude and open to discussion.

First, as to the union in Mid-ocean and paying out the cable from two vessels starting from the same point in opposite directions; I am at a loss to conceive any real advantage from this mode of proceeding, except such as may arise from the probability of fine weather being limited to but a few days continuance from the commencement of the operation, and even this it appears to me may be over balanced by the chances of starting with fine weather from the coast where all such probabilities may be calmly discussed; on the other hand, if we should not meet with fair weather at mid-ocean, we may lose much more time and incur greater risks in effecting a junction of the cables.

Starting with one end of our cable from land, we should have one junction less to effect at sea, and test our machinery near to shore, thus proceeding with encouragement, moreover we should proceed in unison to mid-ocean with our whole experienced staff united; and there, should it be decided for the *Agamemnon* to return, we should be enabled to draw off our most experienced hands from that ship, to unite with those on board the *Niagara*, to proceed onward to Newfoundland.

Once at mid-ocean proceeding as I have described, the joining the end of the unlayed portion from the *Niagara* to the end of that already laid down, would in fact be only a continuation of the act of paying out, which appears to me in every way preferable to commencing in mid-ocean, where the junction or centre of a curved line has to be dropped to a depth of upwards of two miles. In fact, I here see considerable difficulty, even supposing fine weather to exist in getting this down straight, from the tendency of the centre to untwine itself and form kinks in descending. That it may be possible to obviate this by passing large balls of heavy wood, or a tube threaded on the centre I admit, but in the junction of the end of the portion on board the *Niagara* to the end of the portion already laid down from the *Agamemnon*, no such difficulty would arise (the junction once effected), it would only be a continuation of paying out; and suppose the weather on our arriving at mid-ocean too unfavorable for uniting the Cable, it will only be necessary to buoy the end of the Cable, and lay by for a few days; a small attendant steamer could keep a look-out for the buoy, to which I would suggest (if approved by nautical men) a lighter, with a mast should be attached; and supposing several buoys to be attached, the lighter to ride by the outermost, to prevent a strain upon the Cable.

These views therefore resolve themselves into the following considerations in favor of commencing at the coast of Ireland:—

1st—The assurance of fine weather for a start.

2nd—The reducing of three junctions of the Cable to be effected at sea to two.

3rd—The advantage of saving the whole experienced staff united throughout the operation, instead of being divided; and especially the fact, that in the event of an accident, the whole force would be on the spot and acquainted with its causes; whereas, supposing a rupture of one portion of the Cable, or the electric current to occur when the vessels are one hundred, or say, a thousand miles distant, the vessel whose portion might be perfect would be paralyzed, she could neither move forward or backward, until she had learnt the cause. Thus supposing each vessel to have paid out 500 miles, which would place them 1000 miles apart, it would be almost impossible to communicate by a messenger steamer in time to be of utility, this in fact appears to me the gravest question against the opinion for commencing at Mid-Ocean.

As to the vessels losing sight of each other, it appears to me, as the speed would not exceed five to six knots per hour, and that there would be a convoy of four vessels instead of two, this would not be likely to occur; but the eminent nautical opinions, we have to aid us, will be able to satisfy us on these and other nautical questions.

I remain, my dear Sir, yours very truly,

JOHN W. BRETT,

WM. BROWN, Esq., M.P.

London, July 10th, 1857.

To the Directors of
THE ATLANTIC TELEGRAPH COMPANY.

Gentlemen,

I beg to lay before you my views in regard to the proposition for altering the original plan of laying the Atlantic Telegraph Cable, by starting from the Irish Coast instead of commencing from the centre as previously determined upon.

It is urged that from the possibility of a westerly gale arising during the progress of the *Agamemnon* from the centre to the eastern terminus of the Cable at Valentia, there is some risk of the lowest speed at which, under such circumstances, she could make being so great as to endanger the successful laying of the line, and that it might be difficult, if not impossible, in unfavorable weather to bring her with safety so near to the coast of Ireland as to land the shore end of the Cable at Valentia.

It is further advanced that the adoption of the new plan would be more desirable in the electrical department, on account of the difficulty which would exist under the original plan in ascertaining the nature of the fault in the event of any interruption of communication between the two vessels.

I have considered the former objections (which may be called the nautical difficulties), before, and have discussed them carefully with the Engineers who will assist me in laying the Cable, but I have not been able so maturely to weigh the importance of the electrical points as compared with the danger which I and my colleagues see in other respects in a change at this late period from the original plan, having only heard them suggested for the first time at the conference on Wednesday.

I think from what passed at the Meeting that the nautical difficulty may be overcome, at all events I consider that the risk which will be encountered by laying the Cable from the Irish Coast, instead of commencing midway between Ireland and Newfoundland is of infinitely greater importance.

By reversing the Propeller of the "*Agamemnon*," and by using some Drag, such as that suggested by Sir Baldwin Walker, or by employing the *Leopard* in the manner proposed by Captain Wainwright, or by heaving-too the ship and allowing her to drift, the rate of the "*Agamemnon*" would be retarded sufficiently to deliver the Cable into the sea with safety; and in this we should be assisted by having the largest and most complete coil which has ever yet been made for such a purpose, and by the improved machinery fitted for paying out this line.

The difficulty of making Valentia, should the weather on the Irish Coast be unfavorable, is not of great consequence, for should it be necessary to part with the Cable on approaching land, the comparative shallowness of the water would allow of its being easily buoyed, and connected with the shore at a more suitable time. Sub-marine Cables are continually buoyed in the North Sea, at distances varying from ten to fifteen miles from land, where they are frequently left for weeks, and are then taken up and joined to the shore.

On the other hand by starting from Ireland, we encounter the probability of losing the rope in the attempt to join it in the middle of the Atlantic, with a strain of two thousand fathoms upon it, for it must be remembered that we have been compelled, in order to keep down the bulk and weight of the Cable, to make its proportions and materials such, that we cannot rely upon its sustaining a greater strain than would arise from supporting a weight of three tons and a half.

When we have to change from one ship to another, the egress of the Cable must be stopped for a time, and even in fine weather this would be an operation of considerable risk; and should there be the least wind or current, the drifting of the ships would bear upon the Cable in a manner that would, to say the least, be very dangerous.

But it should be borne in mind that the occurrence of bad weather at the time when the splice must be made, would make the loss of the line an absolute certainty.

Lieutenant Maury, whose data as to the frequency of gales in the North Atlantic have been generally accepted, gives the average of gales in the month of August, between 35° and 30° long, (the part where the splice must be made) as 2, and between 30° and 25° as 1. The other parts of our route, except those next to the shores of Ireland and Newfoundland, are estimated by comparison as 0.

Thus the 5° of longitude in the central portion of our line, where fine weather is of the most vital consequence, present almost the greatest liability to gales of the entire route. In addition to this we are informed that the probability of fogs occurring in the five degrees immediately preceding the above (that is to say, between 30° and 25° long,) may be estimated at 6, which, as will be seen from the scale below, is greater than at any other point except on approaching the coast of Newfoundland.

	55	50	45	40	35	30	25	20	15	10	
Newfoundland . . . .											.....Ireland
Gales	1	1	0	0	2	1	0	0	4		
Fogs	6	8	8	2	0	6	1	0	3		

So that just before we enter the region where the splice must be made we run considerable risk of parting company, which would involve the danger of holding on by the Cable until the vessels could meet again.

By commencing from Ireland we should double the time occupied in laying the Cable, and proportionately increase the risk of losing it by meeting with bad weather.

It has been put forward as an argument in favor of the new method, that half the Cable would be saved in the event of any accident arising in effecting the junction; but under the original plan we meet with our greatest difficulty at the outset by starting midway in the deepest water. If we lay the first 100 miles—50' from each ship—safely, we have every reason to rely upon the expedition being crowned with success. If the Cable is lost it will probably be in the deep water, and nearly the *whole* of the line will then be brought home.

Under the original plan we are sure of the junction being well made: we proceed to the centre, and, should not the weather be propitious, we can wait as long as may be necessary, and if any failure should occur in making the first joint, we can repeat the operation again and again, with the loss of few miles only of the Cable.

In the new plan the failure of passing the bight overboard in changing from the Agamemnon to the Niagara, which would be attended under the most favourable circumstances with very great risk, would at once lose 1,200 miles of Cable, and any plan of buoying the Cable to relieve the strain, such as proposed at the conference yesterday, would add to the complication of the work, which, it must be remembered, might have to be attempted at night or in bad weather.

The mode of effecting the splice in itself presents a serious difficulty in the new plan. The ends of the Cable being different in the direction of their lay, each would have a tendency to unwind, and the gutta percha covered copper wire would then be twisted and broken off.

This must be met by serving wires reverse to the lay of each rope for at least two miles to form a neutral length at the splice.

This would nearly double the weight of the Cable in the neighbourhood of the junction, bringing a tension when the ordinary Cable again passes from the vessel, more than it is capable of bearing.

For the above reasons I am in an engineering point of view most strongly in favor of adhering to the plan originally adopted for commencing in mid-ocean, and in this opinion I am supported by the Engineers who are co-operating with me.

With regard to the electrical reasons which have now been suggested, for altering our previous arrangements, I must say, that I have been completely taken by surprise at this new source of objection.

Of course, if the communication is suddenly stopped, although it is easy for the Electrician to tell whether the fault is near to his ship, or remote from it, and therefore, probably occurring within two or three miles from the other ship, still he will be unable to know what steps are being taken to remedy the defect.

This difficulty must have existed from the first, and it is peculiarly embarrassing to me that the discussion of its importance as compared with the other conditions necessary to success should have been deferred until a fortnight previous to our departure, when we are under so great a pressure for time, if the undertaking is to be carried out this year.

Should any defect arise between the shore and the vessel, in the new plan, the same electrical difficulty would arise if the paying-out ship, not knowing the nature of the fault, but supposing it to be on the shore, should proceed on her voyage, continuing to pay out the Cable. It is true that the chances of such an emergency do not appear so great, but we are to a certain extent trying an experiment, and although we believe from the soundings taken from 30 to 50 miles apart, that the bottom is soft and level, there may yet be sharp rocky points where the Cable may be destroyed.

In conclusion, the points which have to be decided by you, appear to me to resolve themselves into the choice between the almost certain loss of 1,200 miles of the Cable by commencing from the coast of Ireland or by keeping to the original plan: the possibility of paying out some additional length of Cable at one end, should it happen that the other end is altogether lost.

I am, Gentlemen, yours faithfully,

CHARLES T. BRIGHT, *Engineer.*

